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1921

Vol. 4 No. 9 TORONTO Published by A. F. Penton & Co.

Price

DEC 1 - 1921

Office Library

AVIATION & WIRELESS News

When You Need Wireless Apparatus Call "9BA" the EATON Wireless Supply Section

From 4.30 to 5 p.m. daily.

THE wireless section has been recently opened up on the Sixth Floor of Housefurnishings Building with a complete stock of Radio supplies. The licensed operator in charge is at your service for supplying information and for helping with any problems relating to Wireless Telegraphy and Telephony.

The EATON prices on "Firco" Radio Apparatus

The midget type "Firco" units are the product of superior workmanship—sturdily built and well finished. The various panels may be combined together, forming a very attractive and efficient set.

PRICES OF UNITS

Type 39A—Midget One Stage Amplifier	\$24.00	Type 36A—Midget Detector	14.50
Type 40A—Midget Two Stage Amplifier	43.00	Firco Vocaloud, loud speaker	42.50
Type 35A—Midget Receiver	23.50	Firco Air Cooled Rheostat, for panel mounting	1.65
Type 37A—Midget Detector and One Stage Amplifier	33.00	The Saco-clad Audio-frequency Transformer	7.00
Type 38A—Midget Detector and Two Stage Amplifier	57.50	Bull Dog Grip Interchangeable Telephone Plugs. Round, \$3.00. Flat, \$2.00.	

A FULL LINE OF "A.B.C." AND "MIGNON" CABINET UNITS IN STOCK AT VERY ATTRACTIVE PRICES.

FEDERAL MICROPHONES

No. 264W	\$20.00	No. 263W	7.50	Federal Telephone Jacks—	
No. 260W	10.00	Federal Head Telephones,		No. 1423W	1.35
No. 262W	7.50	\$11.50 and 15.00		No. 1435W	1.65
				No. 1438W	2.00

NOTE THESE PRICES FOR MAGNET WIRE

Cotton Covered

No. 22	\$.90 lb.
No. 24	1.00 lb.
No. 26	1.10 lb.
No. 28	1.25 lb.
No. 30	1.45 lb.
No. 32	2.00 lb.
No. 36	4.95 lb.

Silk Covered

No. 22	\$1.25 lb.
No. 24	1.75 lb.
No. 26	1.85 lb.
No. 28	2.00 lb.
No. 30	2.95 lb.
No. 32	3.35 lb.
No. 36	7.25 lb.

Double

Silk Covered

No. 28	\$4.00 lb.
No. 30	4.25 lb.
No. 32	6.75 lb.

ANTENNA WIRE

No. 14 Bare Copper, 55c per 100 ft.
No. 22 3-strand Bare Copper, \$1.30 per 100 ft.
7-strand, extra heavy, \$3 per 100 ft.

"RELIABLE" B BATTERIES

22½ Volt Plain	\$1.85
45 Volt Plain	3.25
22½ Volt Tapped	2.10
45 Volt Tapped	3.50

Lightning Switches, mounted on composition base, single pole, double throw, 100 ampere, 250 volt. Price, \$5.25.

THE T. EATON CO. LIMITED
TORONTO CANADA

Highest Quality Prompt Service

You want to be sure of these when purchasing

RADIO EQUIPMENT



Our type R2 filament rheostat for power tubes—3.3 ohms, 4 amps. capacity



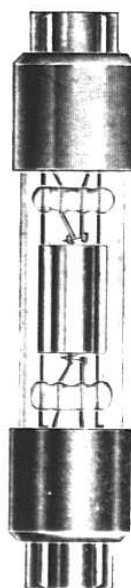
Our De Forest Vernier Condenser giving straight line wave length curve. It is highest grade and carried in various sizes.

WE are manufacturing complete units for receiving and transmitting and also combination units. Get our prices and descriptive literature.

Our parts, such as Transformers, Rheostats, Microphones, etc., have made a record for design and satisfaction in service.

THE RAC-3 AUDIONS.

The RAC-3 Audion is a distinct advance in radio communication. It functions as a detector, oscillator or amplifier. This tube is in a class by itself, being superior in every respect to any other vacuum tube on the market. We are the sole distributors in Canada for the RAC equipment.



RAC-3 Audions.
The first Universal Audion for reception and amplification.

De FOREST EQUIPMENT

The contributions made by Dr. De Forest to the art of radio communication are well known to all. We are carrying a stock of De Forest equipment, being the sole distributors for Canada for the complete line of De Forest products. We are in a position to supply these well known goods promptly and will be glad to send descriptive literature and prices upon request.

OUR PRICES on our own manufactured apparatus will be found considerably lower than the prices heretofore asked for apparatus of the same high grade. On our imported equipment and apparatus we are taking a very small margin of profit in order to make our prices reasonable.

We allow special discounts to bona fide dealers.

Place your orders before the Christmas demand begins.

Order through your local dealers or direct from the factory. Write us if you want any information re Wireless

Concerts (450 meters) every Monday and Thursday Evening from 8 to 9.30 o'clock.

CANADIAN INDEPENDENT TELEPHONE CO., LIMITED

Offices : 212 KING STREET W.

Factory : WALLACE AVE., TORONTO



RADIO APPARATUS

*Distributors of Reliable Radio Apparatus to Schools,
— Colleges and Experimenters —
All Over the Dominion !*

We build Apparatus to your specification, raw material and parts. Fine machine work done. We will be glad to build equipment of special design to meet your requirements if you cannot find what you desire in standard equipment.

Radio Supplies

BROWN'S SUPER-SENSITIVE PHONES

Type D—	
8000 ohms	15.00
Type A—Adjustable	
8000 ohms	18.75
4000 "	18.25

Amplifying Transformers

Can. Ind. Tel. Co. Audio Frequency.	
Transformers	6.25
Soco Clad	7.00
Acme	7.50
Modulation Transformer	6.25

Radio Audion Bulbs	4.75
Base, with Clips, for Bulb	1.50
N. A. A., Tested Galena or Silicon30

" B " Batteries

A B C,	27 v, variable	3.75
Ever Ready,	22.5 v, "	3.75
Reliable,	22.5 v, "	2.10
"	45 v, "	3.50
"	22.5 v, without taps	1.85
"	45 v, " "	3.75

Variable Condensers

Murdock, 21 plate	5.00
" 43 "	6.00
Chelsea, 21 "	4.50
" 21 " with knob and dial	5.25

Bakelite Panelling, 1/8, 3-16, 1/4.	
Condensite Celoron, 1/8, 3-16, 1/4.	
Prices on application.	

Canadian Radio Electric Company

782 Logan Avenue

Toronto, Ontario, Canada

THERE WILL COME A TIME WHEN YOU WILL HAVE TRIED PRACTICALLY ALL TYPES OF APPARATUS AND YOU WILL DISCARD THEM ONE BY ONE BECAUSE OF BLOW-OUTS - BURNING UP - OR POOR CONSTRUCTION IN SOME PHASE -



AND WHILE YOU STILL HAVE PRESENCE OF MIND YOU WRITE TO THE CHICAGO RADIO LAB. FOR ONE OF THEIR CATALOGUES -



AND YOU DECIDE TO PLACE AN ORDER WHICH YOU RECEIVE IN DUE TIME - THEN - BEFORE THE NEXT YEAR ARRIVES WE ARE SURE THAT THE APPARATUS WAS SATISFIED IN REGARD TO EFFICIENCY AND FUNCTION -



AND THAT YOU ARE READY TO MAKE A NEW YEAR'S RESOLUTION TO THE EFFECT THAT

THE C.R.L. WISHES ALL A MERRY XMAS AND A HAPPY NEW YEAR

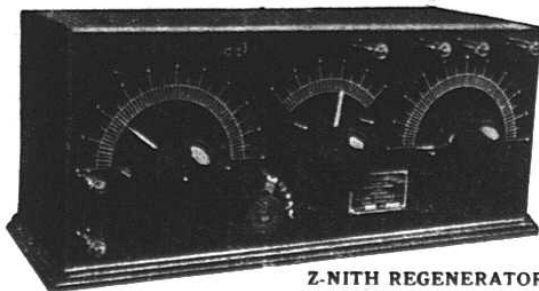
6
ANDERSON 90QS



I RESOLVE : NEVER TO USE ANY OTHER APPARATUS THAN THAT OF THE CHICAGO RADIO LABORATORY

MAKE YOUR RESOLUTION NOW - NOT NEXT YEAR !!

An
Xmas
Present



Z-NITH REGENERATOR

Lasting
the Year
Round

What could be more desirable as a Xmas Gift than an instrument that opens to its owner the gateway to a world of new, interesting, and instructive experience ?

The user of a Z-Nith Regenerator has the Radio world at his will, Radiophone, CW and Spark Stations inaudible on ordinary equipment can be copied with ease

on this improved set, with **Balanced Variometers**, 180-1200 meters range, 180° coupling, etc.

If your station already has a Z-Nith Regenerator; a Hy-rad Rotary Gap, an Amplifigon or one of the many other Individual Z-Nith Products will form an equally satisfactory gift.

We are making a special price reduction offer for Xmas.

Special Preparations Enable Us To Make Immediate Shipments

CHICAGO RADIO LABORATORY, Inc.

6433 RAVENSWOOD AVE., CHICAGO, ILL., U. S. A.

Write us or our

Canadian Representative—Ontario Radio Laboratory, 422 North St., Sault Ste. Marie, Ont.

RADIO APPARATUS

*Distributors of Reliable Radio Apparatus
to Schools, Colleges, Radio Clubs & Experimenters
All Over the World!*

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SERVICE FILLS ORDERS

FOR "GREBE RADIO" ANYWHERE!

THAT APPARATUS OF PROVEN MERIT!



"PITTSO"

SERVICE DISTRIBUTES "RADIO

CORPORATION'S" PRODUCTS ALL OVER

THE WORLD! TRY US AND SEE!

AMPLIFYING TRANSFORMERS

No. UV-712 Radio Corporation	\$7.00
No. P-1 Saco-clad, shielded type	5.00
No. QO. Clapp-Eastham, semi-mounted	4.00
No. 50 Chelsea, just out	4.50

ANTENNA WIRE

"Pittsco" No. 14 hard drawn copper (80 ft. per lb.), per lb.	.40
500 ft. special value at	2.25
"Pittsco" 7-strand No. 22 tinned copper, per ft.	.01
500 ft. special value at	4.25
1000 ft. special value at	7.50
"Pittsco" 7-strand No. 20 phos. bronze, per ft.	.02
500 ft. special value at	7.50

AUDION CONTROL PANELS

No. RORH Grebe in cabinet with tickler connections	\$17.00
--	---------

No. 330 Remler, with "A" Battery potentiometer	8.00
No. Y-1 Acme in cabinet	10.00
No. 70 Paragon, moulded type	6.00

"B" BATTERIES

No. 7623 Standard, 22.5V. small	\$1.50
No. 7625 Standard, 22.5V. large	2.50
No. 7630 Standard, 22.5V. variable	2.50
No. 763 Eveready, 22.5V. small	2.25
No. 766 Eveready, 22.5V. variable	1.00
No. 627 Ace, 45V. variable	1.50

BOOKS

Practical Wireless Tel. by Bucher	\$2.25
Wireless Experimenters' Manual, by Bucher	2.25
Vacuum Tubes in Wireless Communication, by Bucher	2.25
How to Pass the U.S. Govt. Exams. by Bucher	.75
Practical Amateur Stations, by Bucher	.75
How to Conduct a Radio Club, by Bucher	.75
Robinson's Manual of Wireless Tel., by Lt. Comm. Robinson, U.S. Navy	2.50
Radio Telephony, by Goldsmith	2.50
C. W. Instruction, by Radio Corp.	.25

BUZZERS

No. 77 Mesco, high frequency	\$2.50
No. 168 Century, high frequency	2.50
No. 170-A General Radio, high frequency	2.00
No. 9010 Bunnell, watch-case, nickel or brass	.75

CONDENSERS (Grid Type)

No. P-1 GA .0005 MF	.35
No. P-2 GA .001 MF (phone)	.35
No. P-3 GA .0005 MF and 1/2 meg. leak	.50
No. ROCA Grebe .0002 MF and 1/2 meg. leak	1.20
No. ROCB Grebe .0002 MF and 3 meg. leak	1.20

CONDENSERS (Variable)

No. 366 Murdock, .001 MF in case	4.75
No. 368 Murdock, .0005 MF in case	4.00
No. 1 Chelsea, .001 MF in case	4.50
No. 2 Chelsea, .0005 MF in case	4.50
Perfection, 11 Plate knockdown	1.00
Perfection, 21 Plate knockdown	2.25
Perfection, 41 Plate knockdown	3.20

COILS (DeForest duo-lateral)

Note Lower Prices—

DL-25	\$1.40
DL-35	1.40
DL-50	1.50
DL-75	1.50
DL-100	1.55
DL-150	1.80
DL-200	1.65
DL-250	1.70
DL-300	1.75
DL-400	1.80
DL-500	2.00
DL-600	2.15
DL-750	2.35
DL-1000	2.60
DL-1250	2.80
DL-1500	2.80

CRYSTALS

No. P-1 Silicon, unmounted	.25
No. P-2 Galena, unmounted	.25
No. P-3 Silicon in Wood's metal	.50
No. P-4 Galena in Wood's metal	.50
No. P-5 Radiocite, unmounted	.50
No. P-6 Wood's metal, only	.25

CRYSTAL DETECTORS.

No. RPDB Grebe, dustproof	\$2.75
No. 8354 Jove	1.75
No. 324 Murdock	.70

DIALS

No. P-1 Somerville, dial indicator	\$2.00
No. P-2 Tuska, 1/4 inch or 3/16 inch shaft	1.50
No. P-3 Chelsea, 1/4 inch or 3/16 inch shaft	1.00
No. P-800 Clapp-Eastham 180° type	.75
No. 100 Remler 0-1800 complete	1.00

GRID LEAKS

No. UP-516 Radio Corp., 1/2, 1, 1.5, 2, 2.5 or 3 megohms, each complete	1.25
Grid leaks, only	.75
Bases only	.50
No. 96 Remler, adjustable type	.50
No. 21 Chelsea, variable, 10 values	1.00

INSULATORS

No. P-1 Electroze, Ball type	.35
No. P-2 Electroze, 4 inch type	.45
No. P-3 Electroze, 10 inch type	.75
No. P-4 Electroze, 16 inch type	1.50

JACKS

No. 1421-W Federal, open jack	.70
No. 1422-W Federal, closed jack	.35
No. 1423-W Federal, 2 circuit jack	1.00
No. 1425-W Federal, Auto. Fil. control	1.20
No. 1438-W Federal, Auto. Fil. control	1.50

KEYS

No. 8650 Mascot, Brass, up to 1/4 K.W.	\$3.00
No. 7943 Beeko, practice type	1.40
No. 285 Murdock, strap type	.70

LOOSE COUPLERS

No. 344 Murdock, 1500 meters	\$ 9.00
No. P-673 Clapp-Eastham, 3,000 meters	14.00
No. A-1 Arnold, Navy type, 3500 meters	20.00

OMNIGRAPHS

No. 2 Omnigraph, 15 dial machine	\$30.00
No. 2 Jr. Omnigraph, 5 dial machine	22.00
No. 5 Omnigraphs, 1 dial machine	14.00
Set of 15 dials, Continental	4.00

PLUGS

No. 50 Pacent, universal type	\$2.00
No. 1428-W Federal, Brass	2.00
No. 1428-W Federal, Silver-plated	2.50

PLUGS (Bakelite)

No. 40 Remler, Bakelite coil plug	.65
No. 41 Remler, Bakelite panel plug, station-ary type	.65
No. 43 Remler, Bakelite coupling plug	1.10
No. 45 Remler, 14 inch fiberold strap for coils	.15

POTENTIOMETERS

No. PR-536 Radio Corp. "A" Battery type	\$2.00
No. 93 Remler, "A" Battery type	.75
No. F-743 Clapp-Eastham "B" Battery type	3.00

RECEIVING SETS (Crystal)

Westinghouse, "Aerola," with Brandes' "Superior" phones	\$25.00
Radio Service, Type S-3, without phones	7.50
Amrad, latest model, without phones	20.00

RHEOSTATS

No. PR-535 Radio Corp., moulded, for UV-200, UV-201 and UV-202 tubes	1.00
No. 90-P Shramco, 6 Ampere type, for 1 UV-203, 50 watt tube	2.00
No. 500 Murdock, new type	1.00
No. 810 Remler, junior, 1.5 amps	1.00

SOCKETS

No. UP-553 Radio Corp., Bakelite type for UV-200, UV-201 and UV-202 tubes	1.50
No. 92 Remler, moulded	1.50
No. 156 General Radio	1.50
No. 550 Murdock, moulded type	1.00
No. S-2 Radio Service, double	2.25
No. S-3 Radio Service, triple	3.25

TELEPHONES

No. 56 Murdock, 2000 ohms double	\$ 5.00
No. 58 Murdock, 3000 ohms double	6.00
Baldwins Type C	15.75
Baldwins Type E	15.00
Baldwins Type F	16.25

VARIOMETERS

No. 500 Remler, Bakelite, moulded	\$6.00
No. 501 Remler, with knob and dial	7.00
No. 502 Remler, panel mounted type	9.75
No. 2806 Amrad, new type, basket wound dial	6.10
No. 2806 Amrad, new type with knob and dial	6.75

VARIOCOUPERS

No. 503 Remler, 1800° type	\$ 4.00
No. 504 Remler, with knob and dial	6.40
No. 505 Remler, panel mounted type	12.75
No. 2613 Amrad, new type, just out	6.25
No. 2613 Amrad, new type with knob and dial	6.90

"LET 'PITTSO' products, SUPER-SERVICE and delivery solve your Xmas problems"

SEND US YOUR ORDERS TODAY!

Send ten cents in stamps for Catalog No. 22. Over 100 pages, over 150 illustrations, over 600 items.

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Boston, Mass., U.S.A.

"PITTSO" Service reaches all over the world. Why not let it reach you!

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Condensite Celoron Is Real Radio Insulation

Use the highest type insulation made.

PRODUCED EXPRESSLY for
WIRELESS WORK

Adaptable to every machining process and ready for every use—panels, plates, bases, rods, tubes, bushings, handles, cleats, etc.

To high resistivity and extreme water resistance CONDENSITE CELORON adds every other good quality demanded of an efficient insulator. It puts wireless insulation a step ahead. This Bureau of Standard test tells why :

Wave Length Meters	Approximate Frequency Cycles per second	Phase Difference Degrees	Dielectric Constant-K
373	804,000	2.0	4.7
1,295	231,500	1.8	4.8
3,067	97,800	1.8	4.9



CONDENSITE CELORON is regularly supplied in standard size sheets, rods and tubes ready for all machining purposes—for experts and amateurs. Sold by radio equipment dealers everywhere. If your dealer cannot supply you, write us.

DIAMOND STATE FIBRE COMPANY of CANADA
LIMITED

Head Office and Works :

235 Carlaw Ave. - - TORONTO, Ont.

STEPPING-STONES TO BETTER SIGNALS

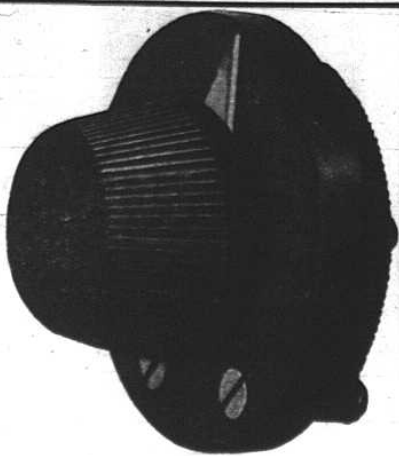
Every FADA instrument, be it detector and two-stage amplifier or only a simple inductance switch, is a real asset to your station. Step by step as you progress from your crystal detector set to vacuum tubes, regenerative circuits and radiophone work you will find that FADA supplies are necessities, and what is more, necessities that can be purchased from your own dealer at most reasonable prices for the value you receive.



INDUCTANCE SWITCH

The neatest switch on the market and the easiest one to adjust. Has the FADA Thermoplas knob. 1 1/4 inch radius. Each\$0.50

With eight switch points and two switch stops complete. Each\$0.75



FADA DETECTOR-AMPLIFIERS

include the following instruments, in beautiful cabinets and with full automatic filament control:—

Detector Control	\$16.50
Detector and One-stage Amplifier	45.00
Detector and Two-stage Amplifier	65.00
Two-stage Amplifier	50.00

A BEAUTIFUL FADA CATALOG

of instruments will be mailed upon receipt of ten cents. Contains complete description and illustrations of all FADA instruments and supplies. You should study this catalog before purchasing any equipment.

CANADIAN RADIO STORES

FADA products are fast sellers that stay sold. The sales prices are reasonable and your profits good. Write for catalog and terms.

FRANK A. D. ANDREA

Manufacturer of FADA Radio Products

1882-E JEROME AVE.

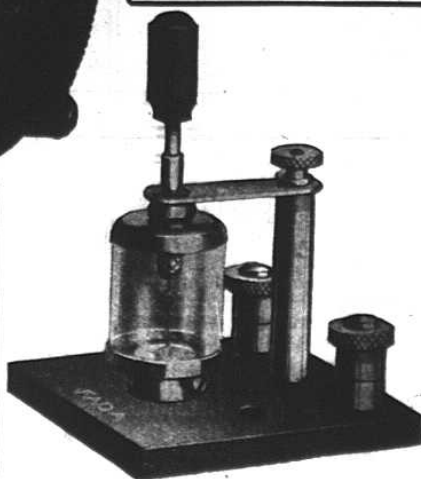
NEW YORK CITY

PANEL-MOUNTING RHEOSTAT

FADA rheostats are made with a heat proof Thermoplas base. The resistance is 6 ohms and it will carry 1 1/2 amperes. Supplied with the FADA conical Thermoplas knob. Adjustment very smooth. Without question the best value obtainable for\$1.00

FADA CRYSTAL DETECTORS

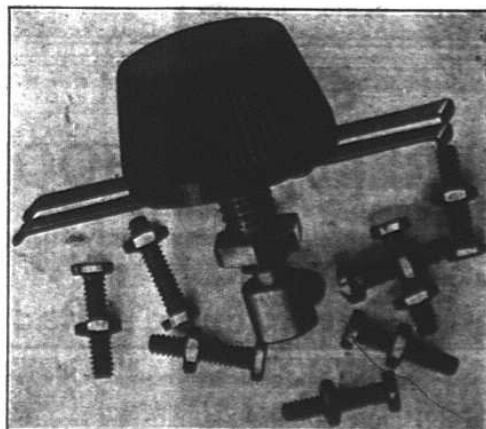
are used in thousands of amateur stations with mighty good results. Beautiful in appearance, convenient to adjust, and supplied with a super-sensitive galena crystal that enables long distance reception. Each\$2.25



SERIES-PARALLEL SWITCH

Another FADA switch that is very popular. 1 1/2 inch radius, Thermoplas knob. Each\$0.75

Complete with eight switch points and two stops. Each\$1.00



When writing to Advertisers please mention Aviation & Wireless News.

WIRELESS AMATEURS ATTENTION!

If you want service, order from us.
We carry a large stock of High Grade Wireless
Apparatus of our own and other manufacturers.

SPECIAL!!

Vacuum Tube Sockets	\$1.25
Rheostats	1.25
22½ Volt "B" Batteries	1.50
Rasco Dials60
Rubber Binding Posts20
Tested Galena40
Lateral Wound Coils. All sizes.	

Send 5c for our large illustrated catalogue.

J. M. PAQUIN

THE ELECTRICAL SHOP

787 Queen St. W. Adel. 571 Toronto, Ont.

Amateur Radio Apparatus

Order by Mail
Prompt Service
We Ship C.O.D.



Write for
Catalogue
No. 21A



JUST THE THING FOR YOUR PANEL

6 Ohm filament rheostat for panel or flush mounting,
with knob and pointer \$1.75
Standard 4 prong receptical \$1.00

DAVID KILLOCH COMPANY

57 MURRAY STREET, NEW YORK

Amateur Wireless Apparatus and Supplies

We carry a large assorted stock of apparatus made by
leading manufacturers.

Have you tried the "ACE" "B" Battery? We are selling these at the
same price in Canada as in the U. S. A.

22-½ V	Small	\$1.50	Tapped	\$1.75
22-½ V	Large	\$2.50		\$3.00

We cordially invite you to visit our store, and get our advice before purchasing.
It is our policy to supply an Amateur with apparatus suitable for his requirements, and
not to sell him apparatus totally unsuitable, merely to make a sale.

COME AND GET A SQUARE DEAL.

Send 5c for our price list. Special attention to Mail orders.

THE VIMY SUPPLY Co., 567 College St., Toronto

SHAW'S WIRELESS SCHOOL

105 Bond Street, Toronto, Canada

Established 1918. Has made an unequalled record in training Candidates for License Exams. Now offers in addition to instruction in Day and Evening Sessions a new, clear, concise

Home Study Course in Radio

Correspondence invited from all who desire to learn this New Art and prepare for License.

Write H. LIGHTBOWN, Principal, 105 Bond Street, Toronto

Wireless Association of Ontario

(Organized in October, 1913)

PROF. T. R. ROSBRUGH, Toronto, Hon. President

OFFICERS

W. C. C. DUNCAN, Past President.

C. A. LOWRY, President.

KEITH RUSSELL, Vice-President.

W. F. CHOAT, Secretary-Treasurer,

241 Robert St., Toronto.

COMMITTEE

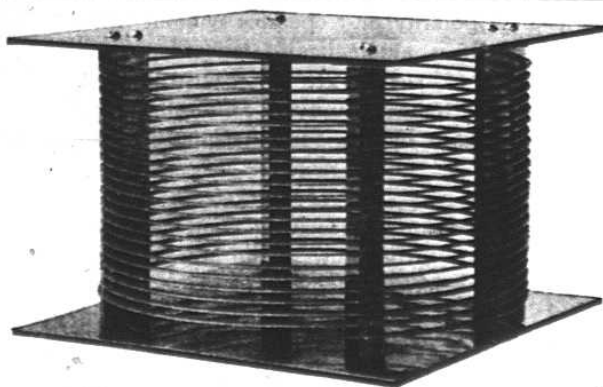
H. H. MOOR, E. J. BOWERS, R. YOUNG,

F. A. CLARK, T. C. CHURCHILL.

C.I.T.C. Concerts

The Canadian Independent Telephone Company has arranged to broadcast a Concert twice a week. They have selected Monday and Thursday Evenings for these Concerts, between the hours of 8 and 9.30. The programme will include a Lecture dealing with the use of the "Wave Meter" and will deal with the making of all kinds of radio measurements.

CANADIAN INDEPENDENT TELEPHONE CO., LTD.
Offices: 212 KING ST. W.



WIMCO CW 100 INDUCTANCE

WIMCO apparatus is very distinctive—it is very high grade and reasonably priced. For instance, the CW Inductance shown above—high conductivity, super insulation, low H.F. resistance low distributed capacity—it is the ideal CW Inductance. We are specializing in CW apparatus—send for catalog.

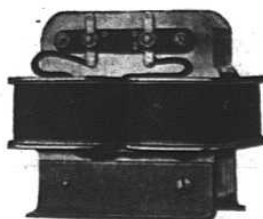
WIMCO products are sold in Canada by
ONTARIO RADIO LABORATORY, SAULT STE. MARIE, ONT.
8ZV—WIRELESS MFG. CO., CANTON, O.—8ZV

Radiophone Filter Combination

Leading manufacturers and experimenters use this ideal Radiophone Filter Combination consisting of two Federal No. 300 W. 800 M. A. Filter Coils and two No. 1000 W. 1 M F Condensers.

FEDERAL Radio Apparatus

is the product of years of experience in the construction of amateur and professional apparatus. Equipment that is accurately constructed; that must pass rigid inspection; in which every part is made by men accustomed to precision.



No. 300-W
800 M.A. Filter Coil

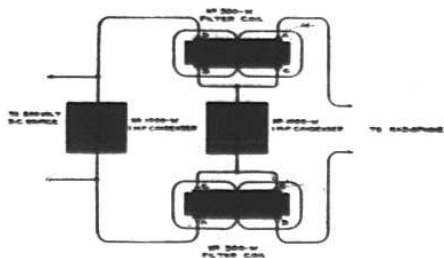
The Federal Filter Coil is of High Impedance Value for A.C. and a negligible resistance to D.C.

Highly recommended for use with both transformer and generator Plate Voltage supply.

Federal No. 1000-W Condenser is of the Mansbridge type and each designed to stand 1000 volts (D. C.)



No. 1000-W
1 M.F. Condenser



FEDERAL FILTER CIRCUIT

Write for Bulletin 103-WB describing
FEDERAL Radio Apparatus.

**Century Telephone and
Construction Co., Inc.**
BRIDGEBURG, ONT.

Canadian Distributors for
Federal Telephone & Telegraph Co.,
BUFFALO, N.Y.

H. S. POWLEY

F. H. MOODY, B.A. Sc., Mem. Am. Soc. M.E.

G. N. MIDDLETON, B.A. Sc., Mem. A.I.E.E.

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FROM OUR DISTRICT ASSOCIATES:

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EDMONTON

BISSET, BUCHANAN & CO.
325 TEGLER BLDG.

POWLEY & MOODY, LIMITED

(SUCCESSORS TO POWLEY & TOWNSLEY, LIMITED)

ELECTRIC INDUSTRIAL AND MINE HAULAGE EQUIPMENT
BATTERY CHARGING AND CONTROL APPARATUS

GOAD BLDG., 105 BOND ST.

TORONTO, CANADA

WINNIPEG

W. A. GOOLD
39 CHARLOTTE ST.

Dear Brother Ham:—

How often do you charge your "A" battery?

Do you notice a decrease in sensitiveness of the audion as the battery begins to approach a discharge condition?

Do you know that the gravity of a lead-acid battery should never drop below 1.170—that if it goes below this point you will have trouble from sulphation?

Would you like to have a device that will fully charge your battery from the lamp-socket without moving the cells from their place or disturbing the connections?

We are offering you for this purpose the "HOMCHARGER" which is fully described in our circular 628 A. Note that the device finds its own polarity and operates without heating or sparking. As the cells "come up" the charging current is automatically tapered toward zero value, thus ensuring your battery against the possibility of overcharge. Note also that we provide a plug and socket for connecting the charging current to the battery. This refinement, an exclusive feature of the HOMCHARGER, is made possible by the fact that the HOMCHARGER is self-polarizing.

To every radio man who wants to get the best results from his receiving equipment, the HOMCHARGER is an absolute necessity. Do not delay! Order now at the present introductory price of \$30.00 each, plus 45c. sales tax.

Very cordially yours,

POWLEY & MOODY, LIMITED.

per C. A. Lowry,
Sales Dept., Radio 9 AV.

P.S.—Do you need a new "A" battery? We quote you on the highest grade batteries:

6 V-40 amp. hour lead-acid battery guaranteed 6 months	\$24.00
6 V-40 amp. hour Edison Nickel-Alkaline battery, made entirely of nickelled steel and enclosed in steel box with cover and lock. Written guarantee for 10 years	69.75

RADIO RESEARCH CLUB OF CANADA

Honorary President

PROF. T. R. ROSEBRUGH, M.A.
Professor of Electrical Engineering, University of Toronto.

President

C. A. CULVER, Ph.D.
Radio Engineer—Canadian Independent Telephone Company, Limited.

Secretary-Treasurer

F. K. D'ALTON
Assistant Lab. Eng., Hydro Electric Power Commission of Ontario
8 Strachan Ave., Toronto.

Committee

W. C. C. DUNCAN, E. J. BOWERS, CAPT. J. E. GENET

THE OBJECTS OF THE CLUB

- (1) To advance the art and science of radio communication by bringing together those who are interested in radio work, whether as scientists, professional radio engineers, manufacturers of radio apparatus, students, experimenters—in short—all those whose work or interest brings them in touch with the problems of radio.
- (2) To conduct and co-operate in radio research.

MEMBERSHIP

Membership is open to engineers, students and anyone else interested in the electrical side of Radio. Application for membership should be sent to the Secretary-Treasurer. They should state experience in Radio work and give as references names of three members of the Club.

MEETINGS

Meetings are held every third Thursday in Room 23, new Electrical Building, University of Toronto. A programme of papers by prominent Canadian Radio Engineers is being prepared for the coming season.

RADIO INQUIRY DEPARTMENT

As an assistance to those interested in Radio, an Inquiry Department is being conducted in "Aviation and Wireless News," for particulars of which see announcement set out elsewhere in this issue.



FIRCO SACO-CLAD
amplifying transformer



FIRCO RADIO EQUIPMENT



FIRCO VOCALOID
Station Type



FIRCO STANDARD
Detector and 2-Step



FIRCO VACUUM
TUBE SOCKETS



IMPORTED BROWN
supersensitive PHONES



HERE might be a full page ad. devoted to every instrument on this page. But the actual apparatus is far more convincing than anything we could say. So we simply refer you to your dealer.

Firco Saco Clad Audio Frequency Transformer. (Patents applied for throughout the world). No howling even with six steps.

Firco Standard Apparatus. Equal to apparatus supplied to the Government. One to six-step amplifiers. Detector and two-step shown.

Firco Audion Sockets. 1/4" Bakelite base, nickel-plated brass tube, universal mounting arrangement. Low prices. Single, double and triple.

Telephone Headsets. Baldwin Mica Diaphragm, three types, reduced prices. The best money can buy. Brown Imported, two types.

Seibt, a low priced, efficient bi-polar headset embodying several marked improvements, 2000 ohms.

Imported Seibt Adjustable Phones, 2000 ohms.

24-page vest pocket Catalogue briefly describing all instruments sent for your dealer's name and address. Large loose-leaf Catalogue and your name on our mailing list for six months for 25 cents.

Vocaloid. This clear-toned loud speaker is proving the sensation of 1921 radio. No batteries, no adjustments, no extra equipment. Station type, in polished mahogany cabinet, as shown, also lower priced. Laboratory type mounted on adjustable base.

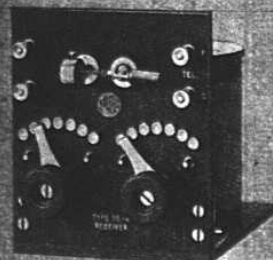
Firco Midget Units. Quality equal to Standard Apparatus, but greatly simplified. Single and double circuit receivers, audion detectors and amplifiers, embodying new features. Perfect results and workmanship.

Firco-Eldredge Meters. All nickel plated flush type, 600-volt meter with multiplier. Other ranges, moderate prices.

Firco "Bull-Dog-Grip." Interchangeable Telephone Plug. Insert or remove standard cord tips in 10 seconds. Then "The harder you pull, the tighter it grips." Two types.



FIRCO MIDGET UNITS
(Tuner, detector and 2-step, \$56.20)



FIRCO MIDGET
receiving UNIT



FIRCO 600
Volt METER

John Firth & Company, Inc.
18 Broadway New York
Pioneers Since 1901



A WORD TO YOU CANADIAN RADIOISTS: As a pioneer who has been, and is, associated in executive capacity with some of the largest radio companies and projects, I extend to you "GREETINGS." Your country offers wonderful and unlimited radio

possibilities which you must develop. If any of our apparatus can serve you, I would ask that you order from your regular dealer, who is always glad to provide our products.

JOHN FIRTH, President.

AVIATION & WIRELESS NEWS

ADAM F. PENTON, Publisher.

C. E. WILLIAMS, EDITOR

C. LINCOLN-MITCHELL, Publication Manager

Volume 4.

TORONTO, NOVEMBER, 1921.

No. 9

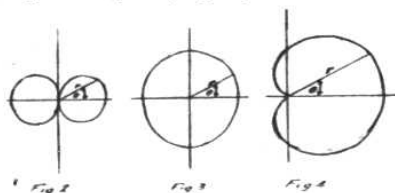
Receiving Station at Louisburg, N.S.*

A Description of the System of Reception in use at the Trans-Atlantic Receiving Station of the Marconi Wireless Telegraph Company of Canada, Limited.

By R. A. H. GALBRAITH

The aerials employed at Louisburg are two sets of Bellini-Tosi loops, situated approximately a quarter wavelength apart and in a more or less direct line with Clifden in Ireland. The receiving house, which I shall call the centre station, is situated midway between the two aerials. The aerials and the receiving apparatus housed beneath them I shall refer to as the end stations.

As is well known, a loop aerial or a Bellini-Tosi direction finder has a polar diagram of reception of the "figure-of-eight" shape. (Fig. 2).



The equation of such a curve is

$$V = \cos \theta.$$

The equation of a circle whose radius is equal to the greatest radius of the "figure-of-eight" is

$$V = 1.$$

Such a curve (Fig. 3) would be obtained from a vertical aerial. If we combine these curves we obtain

$$V = 1 + \cos \theta,$$

the equation of the cardioid or heart-shaped curve (Fig. 4).

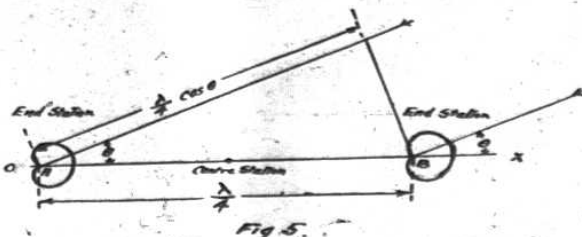
In practice it is not necessary to use a separate vertical wire as well as the Bellini-Tosi loops. An electrically symmetrical connection may be made to each loop circuit, and these points may be earthed through suitable tuning and coupling devices. This is actually the means used at the end stations to obtain the cardioids.

We have now the condition shown in Figure 5.

The radius vectors of the two cardioids are made equal. That is, the "gear" is so adjusted that equal signals are obtained at each end station from Clifden. Moreover, both cardioids are "pointed" towards Clifden.

The apparatus at each end station includes a radio frequency amplifier, the last step of which supplies signals to the centre station over a telephone line. The wires of this line are transposed in order that "aerial effect" may be eliminated as far as possible.

Let us now see what happens when a signal arrives from Clifden; i.e., in the direction XO (Fig. 5). Since



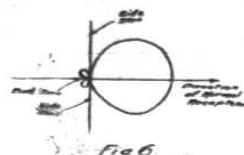
the spacing between the stations is a quarter wavelength, the signals received at A obviously will be ninety electrical degrees behind those received at B. If a signal be received from any other station in the direction θ , the phase spacing will be

$$90^\circ \cos \theta.$$

If these two signals be combined at the centre station so as to subtract vectorially, it may be shown that the maximum amplitude of the resultant is given by

$$R = 2(1 + \cos \theta) \sin(45^\circ \cos \theta).$$

If we plot this equation in polar coordinates, we then obtain the polar diagram of reception for the system. Such a curve is shown in Figure 6. It is known as the "butterfly."

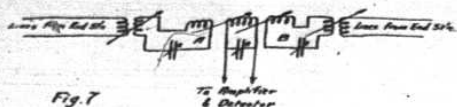


It will be observed that there are three "directions of zero reception," or, more concisely, "zeros." Two of

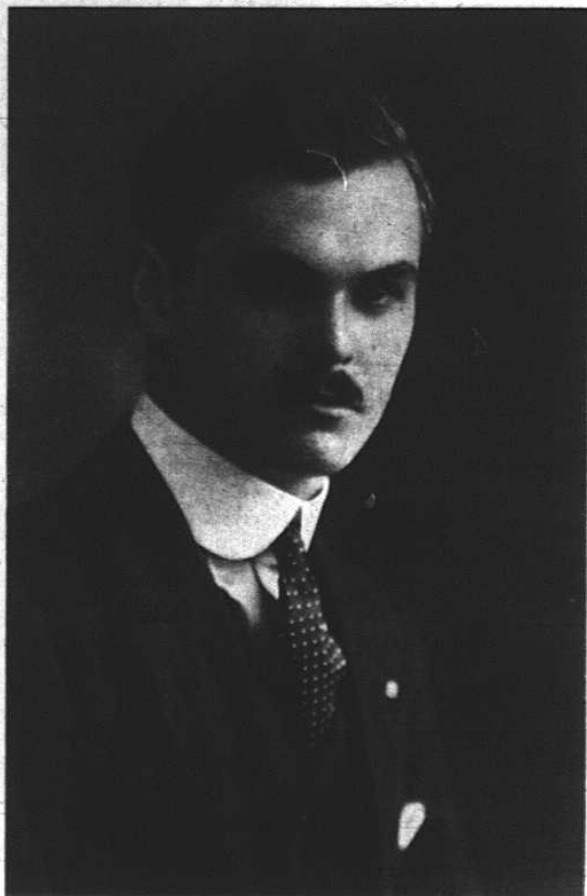
*Abstract of a paper presented before the Radio Research Club of Canada on November 2nd, 1921.

these (the side zeros) are at right angles to the direction of normal reception, while the third (the back zero) is 180 degrees from that direction. The system is then adapted to duplex working if the transmitting station is situated in the direction of one of the zeros. Moreover, a vertical atmospheric, (if there be such) will strike both aerials at the same instant, and the currents due to it will be balanced out automatically at the centre station.

So far we have discussed only the case where all the circuits are in tune. At the centre station the circuits are arranged as shown in Figure 7.



If circuits A and B be mistuned by equal amounts in opposite directions, the misphasing of the signals from the two end stations will no longer be that stated above, but will be altered by an amount depending on the mis-



R. A. H. GALBRAITH

Lieutenant, Reserve of Officers, Royal Engineers. Served during the late war with the Royal Engineers (Wireless), both in France and Italy. Engaged as Radio Engineer with the Marconi Wireless Telegraph Co. of Canada, Limited, during the periods January to September, 1920, and May to September, 1921. Associate Member of Institute of Radio Engineers.

tuning. This will cause a distortion of the "butterfly" curve as shown in Figures 8 and 9.

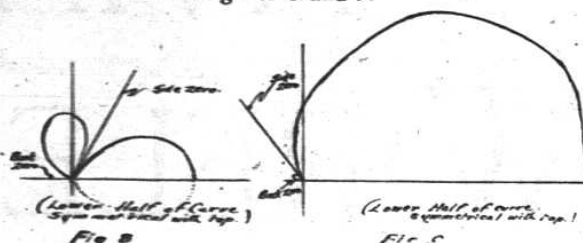


Figure 8 corresponds to a decrease, and Figure 9 to an increase in the total phase difference of the currents from the two end stations.

It will be seen that the back zero is fixed, whatever the misphasing, but that the side zeros can be swung at will through a large angle. This fact renders possible the complete elimination of interference from any station whose direction differs somewhat from the direction of normal reception. It should be remarked, however, that mistuning will destroy the "balance for vertical X's."

The diagrams of reception given above are symmetrical about the line of normal reception. If, however, the direction of normal reception does not coincide with the line between the end stations, the diagrams are no longer symmetrical. The actual state of affairs at Louisburg is shown in Figure 10, and the corresponding diagram of reception is given in Figure 11.

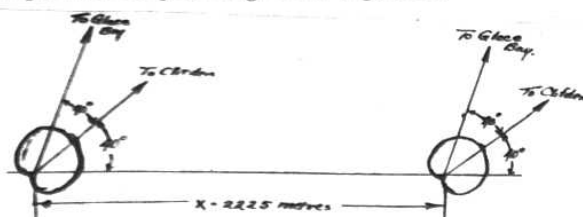


Fig. 10.

This diagram shows that there is a side zero at an angle of 40 degrees from the direction or directly towards Glace Bay. There should, therefore, be a natural duplex

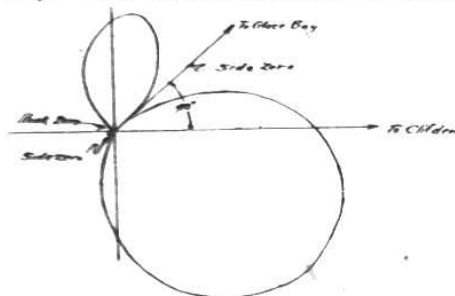


Fig. 11

balance. This is observed in practice, which fact bears out our theory.

The equation of the diagram shown in Figure 11 is $R = 2(1 + \cos \theta) \sin [66\frac{1}{2}^\circ \cos (\theta + 40^\circ)]$.

RADIO PRIZE CONTEST

We hope in next issue to be able to announce particulars of a Prize Contest for Canadian Radio amateurs. This will most likely take the form of prizes for best photographs and descriptions of sets. However, the editor invites correspondence on the subject from readers.

RADIO INQUIRY DEPARTMENT

Conducted under the direction of The Radio Research Club of Canada.

This department will be edited by the Secretary of the above club and the questions will be answered by the member considered to be most familiar with the particular field in question. Where the question is considered of sufficient importance it will form the basis for a discussion at a regular meeting of the club.

Answers will be given covering the full range of wireless subjects, but only those which relate to the technical phases of the art and which are of general interest to readers will be published here, other queries being answered by mail.

The subscriber's name and address must be given in all letters and only one side of the paper written on; where diagrams are necessary they must be on a separate sheet and drawn with India ink. Not more than five questions from one reader can be answered in the same issue. The club does not obligate itself to answer here any question entailing considerable research work, intricate calculations, patent research, etc. However, such an inquiry will be acknowledged and the writer advised as to the basis upon which the question can be answered.

Cobourg, November 8th, 1921.

AVIATION & WIRELESS NEWS,

60-62 Adelaide Street East., Toronto, Ont.

Dear Sirs:

I received your copy of the magazine, and I think it is very good. I would like to make two inquiries of your inquiry department. I hope they will be in time for the November issue, if not, then I would like to see them in the December issue.

- Q. 1.

What would be the correct voltage or input for the primary of a 5 in. spark coil?

- Q. 2.

What would be the secondary output of a 5 in. spark coil?

I remain,

Yours very truly,

P. V. SWAN, Box 755, Cobourg, Ont.

P.S.—I would like this subscription to start in November.

P. V. S.

Answers

The spark coil is a very uncertain quantity, and inasmuch as Mr. Swan has not given the make of coil, we can not state definitely the primary voltage required. His best plan will be to obtain a power supply with good voltage regulation, e.g., storage batteries, and keep increasing voltage until interruption is regular and yet not going so high that the spark at the contacts of the interrupter is maintained too low. The voltage required on primary will depend upon secondary load as well, i.e., whether connected across condenser, to aerial, etc. It can be best found by experiment.

The efficiency may reach 15 per cent. The secondary output is dependent upon the frequency at which the interrupter operates as well as the primary voltage.

Try a six volt automobile starting and lighting storage battery, but don't expect more than 10 or 12 watt output. As a radiator of energy a spark coil is inefficient and is rapidly going out of use.

Have You Our New Radio Catalog ?

Most Complete Catalog of Radio Supplies Published

NO EXCHANGE ON CANADIAN MONEY, FOR MAIL ORDERS

We Stock: Grebe - Radio Corpn. - Remler - Murdock
Chelsea - Tuska - Signal - Jewel - General
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FORMICA or BAKELITE PANELS CUT EXACT SIZE WANTED

$\frac{1}{8}$ " thick 2c per square inch. $\frac{3}{16}$ " thick 3c per square inch. $\frac{1}{4}$ " thick 4c per square inch.

Detroit Electric Co. 434 Shelby Ave., Detroit, Mich, U.S.A.

EIGHTH DISTRICT RADIO CONVENTION

By W. C. C. Duncan

The Eighth District Radio Convention was **SOME** success. That was the unanimous opinion of all who attended it.

The meetings were addressed by prominent men in the radio field on subjects of timely interest ranging from descriptions of new and remarkable apparatus to antenna harmonics. There was also a small but select exhibition of radio equipment. And, to properly round out the convention, there was the banquet.

One of the most interesting speakers at the meetings was Mr. W. C. White, of the research laboratories of the General Electric Company, the man who is mainly responsible for the design and production of the Radiotron line of vacuum tubes.

Mr. White pointed out that vacuum tubes were rated by the manufacturers the same as any other apparatus to give a particular output at which their life and efficiency, etc., were normal. Like other apparatus they could be overloaded, and like overloading anything else, trouble would be sure to follow.

Many useful suggestions for the operation of tubes and the protection of the equipment from abnormal operating conditions were given. One very timely stunt when making adjustments or experiments was to use an ordinary electric fan to keep the tube cool and also to work the tube at low power.

Two large tubes, one of 5 KW output, operating on 15,000 volts, and the other of 1 KW, operating on 10,000 volts, were shown and passed around for inspection. They were burnt out ones.

A very humorous comparison between spark and CW transmitters was drawn by Mr. Thompson, of the Amrad Co. His address was entitled "The Spark Transmitter of To-day," and, although he described the requirements of the modern spark set, he succeeded in pronouncing a requiem on the poor old spark. He is a C. W. enthusiast too.

He compared the spark set to a train. It is fairly reliable and gets to its destination, but it is heavy and cumbersome, monopolizes a lot of territory and requires a tremendous amount of power to get it moving.

C. W., on the other hand, is like the automobile. It is light, convenient, easily handled, quick, and with luck may get you there and back again. Just as the motor car is rapidly replacing the railroad for travel, so is the C. W. replacing the spark.

He predicted that as C. W. continued to replace spark, so the range of the spark set would increase, due to the high development of receiving apparatus for C. W. and incidentally spark reception, but mainly because the fewer spark stations the more chance the remaining ones would have of being copied by the reduction in spark QRM. Speed that night.

Mr. Thompson also spoke for a short time on aeri-als.

An exceedingly interesting rectifier tube was described by him. It is called the "S" tube rectifier, and looks like a new-fangled cartridge fuse. The size shown consisted of a glass tube a little larger than one inch in diameter and about five inches long with heavy copper caps on the ends. The electrodes were about what one would expect to see if it was an enclosed spark gap about one-eighth of an inch long, with the glass tube snugly fitting the electrodes. The tube is remarkable in the fact that it has no filament. There is apparently no

limit to the size to which they can be built, no difficulty having been encountered in making tubes to handle 10 KW at 50,000 volts.

Another interesting device was an aluminum-electrotype condenser having a capacity of 38 mfd and insulated for 500 volts, the aluminum electrode measuring about 7 inches by 2½ inches by ¼ inch.

The Amrad's latest receiving equipment, consisting of a detector-amplifier unit, a short wave receiver, using their basket-weave variometers, and a long wave set. The set presented an embodiment of the latest practices in receiving equipment, the most novel of which was the vernier variometers on the short wave set which were diminutive separate variometers.

The usually-ignored possibility of the production of harmonics in an antenna was discussed by Prof. Ballard of Cornell University. Interesting figures were given for an antenna at Cornell having a natural wave length of 850 meters on which transmission is successfully done at 285 meters with a decrement of .015 and no other wave except that at 285 meters could be located within the limits of a Kolster Decimeter (100 to 3,000 meters).

"Modulation System in Radio Transmission" was the subject of a paper by Mr. L. C. F. Horle, of the Federal Telephone and Telegraph Co. This paper in effect covered the same ground as that of an article appearing recently in Aviation and Wireless News.

The theory and designs of resistance and magnetically coupled amplifiers was discussed by Mr. M. C. Bat- sel of the Westinghouse Electric and Manufacturing Co.

The exhibits of radio apparatus by Buffalo firms, although small, ranged in detail from magnavoxes and short wave receiving equipment to rotary gaps and high voltage supplies for valve transmitters. The deponent had the misfortune to be standing opposite a magnavox listening to the racket from NNZ from a two step amplifier and loud speaker a short distance away when some fiend jammed the microphone of the magnavox down the horn of the loud speaker. Result—almost permanent deafness.

On Saturday night the banquet was held in the Hotel Iroquois. The viands were excellent, starting with a QRA cocktail and polished off with a Low Tension Demi Tasse. John J. Rieger was toastmaster, and among the speakers were Messrs. Warner and Schnell of Q. S. T. fame, James M. Higgins, Chief of Police of Buffalo, who spoke on Police broadcasting and co-operation by amateurs, and Mr. A. F. Parkhurst, the district radio inspector.

A resolution endorsing the recommendations made by representatives of the naval, commercial and amateur radio interests to the Bureau of Commerce was made and forwarded by the convention.

One of the most important works done by the convention was the formation of the "Lower Lakes Executive Council," with Mr. Alexander of Buffalo as chairman. The work of this council will be the organizing and directing of traffic in the Lower Lakes district. It is supposed that this organization will be along similar lines to the Chicago plan and will be supplementary to the general organization of the A. R. R. L. Definite announcements of the plan of this council are eagerly awaited by all.

Radio Manufacturers and Dealers Section

FADA PRODUCTS

A very handsome catalogue has just been received from Frank A. D. Andrea, manufacturer of the well-known "Fada" line of radio apparatus. The high quality and finish of these products is much appreciated. A fine example of this is in his inductance switch knob, the smooth feel of which is known to many an amateur.

DETROIT ELECTRIC CO.

Catalogue No. 5 J, received from the Detroit Electric Co., 434 Shelby St., Detroit, Mich., shows what looks to be a very good aerial change-over antenna switch at a very reasonable figure. Their C. W. oscillation transformers certainly seem to warrant investigation. They are distributors for a large number of American manufacturers, some of whose products are not yet being handled in Canada. Owing to their proximity to Canadian centres, they have been very successful in Canadian business, especially as their firm is well known, having been established in 1886.

DE FOREST AND RADIO AUDION CO. IN CANADA

The Canadian Independent Telephone Company announces that they have arranged with the De Forest Telephone & Telegraph Company for the Canadian field. They will be the sole distributors in Canada of De Forest equipment, and in order to take care of the business will carry a general stock on hand here. The same company is also the sole distributor in Canada of the Radio Audion Company of Jersey City, and are stocking this firm's audions, amplifying coils and receptacles. The Canadian Independent Telephone Company reports much activity at the present time in wireless business.

G. BOISSONNAULT COMPANY, INC.

A very elaborate catalogue has been received from the above firm, whose large display advertisement in this issue will be of great interest to Canadian amateurs. One prominent Canadian enthusiast to whom the catalogue was shown was very much interested in their line of Loud Talking Receivers. In this connection the catalogue says:

"One of the greatest drawbacks since the invention of wireless telegraphy is the receiving of weak signals at the receiving stations. Many devices were proposed to improve this condition but without success, on account of the mechanical difficulties encountered in these amplifying devices.

"The cost of building such instruments was too high, naturally prohibiting the purchase of them by the average amateur. Although recently one or two sound-magnifying devices were introduced in the radio field, yet they possess one disadvantage to the experimenter, and that is the high price.

"However, this was recently solved by the introduction of an exceedingly sensitive transmitter called the Detectagraph Transmitter, which is known to detect sound waves with great accuracy and magnify them through an intermediate telephone circuit.

"A number of microphones have been tried, but without success, which was due to the insensitiveness of the

transmitter. By the employment of the new Super-sensitive Detectagraph Transmitter, the amateur can amplify the radio signals to such an intensity that he can hear the signals about his station without need of the telephone head set.

"By the addition of our Loud Talking Apparatus he is able to hear the message many feet away from the instrument. He is also able to demonstrate the operation of his wireless apparatus to his friends."

THE FEDERAL UNIVERSAL PLUG

The above-mentioned plug, a cut of which appears below, is a radical departure from existing types. It is designed to take any type of conductor, either standard or solid, without soldering.

It is a big improvement over the ordinary telephone



switchboard plug, into which the fragile tinsel conductors of ordinary cords must be soldered, a procedure that is both difficult and tedious. Provision is also made for a tie cord in order to relieve the strain on the connectors.

This plug may be used for plugging in head telephone sets, power supply, microphone transmitters, transmitting keys, and for as many other purposes as the ingenuity of the amateur radio operator may dictate.

A NEW BATTERY CHARGER

A new type of rectifying device has been recently placed on the Canadian market by a Toronto concern. As there are some unique features about the instrument, a brief description of the device will be of timely interest to our radio readers.

Every amateur knows what a nuisance it is to have to disconnect his "A" battery every week or so, lug it down to a garage or service station, and then do without it for a day or more while it is being charged. He will then appreciate the advantage of being able to charge his battery at home.

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Low Resistance

SUPER-SENSITIVE
Detectagraph
MICROPHONE DEVICES

Practical Instruments for Commercial and Scientific Purposes

AMPLIFY YOUR RADIO SIGNALS

With the new DETECTAGRAPH-TRANSMITTER, the amateur can amplify radio signals to such an intensity that he can hear the signals about his station without the need of the telephone head set.

The manner in which the amplifying process is attained is by attaching with tape the DETECTAGRAPH-TRANSMITTER to the regular wireless receiver.

By the addition of a loud talking telephone he is able to hear the messages many feet away from the instrument.

The super-sensitive DETECTAGRAPH-TRANSMITTER herewith shown is two and

three-eighths inches in diameter, five-eighths of an inch thick and weighs less than three ounces. It is the most sensitive sound-detecting device ever brought before the public.

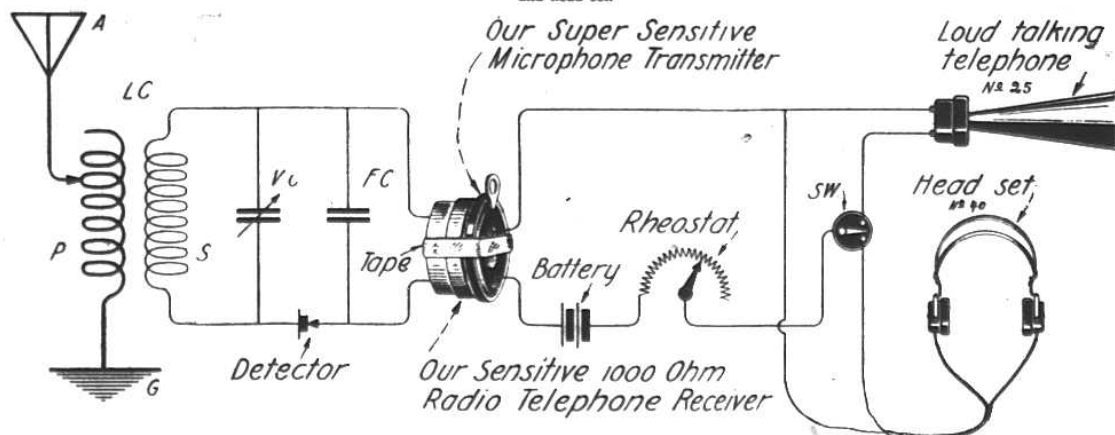
Not only is this instrument applicable for amplifying radio signals, but it can be used with equal satisfaction for amplifying other sounds. Phonograph music can be transmitted from one place to another by means of this instrument, and those who are afflicted with deafness will find enormous benefit by using this transmitter.

Can be used for any purpose where a sensitive detecting instrument is required.



DIAGRAM

Complete connections of our super-sensitive DETECTAGRAPH transmitter. 1000 Ohms radio telephone receiver, loud talking telephone and head set.



This is an actual diagram of a wireless receiving station as used in connection with our instruments for amplifying radio signals. The double contact switch is used for connecting either the loud talking instrument or the double head set.

The Super-Sensitive DETECTAGRAPH Transmitter and the 1000 Ohms Radio Telephone Receiver are held together by wrapping with tape around them as indicated. In actual operation they should be held in a VERTICAL position as the diagram illustrates.

Order direct from ad. Or write for free descriptive new catalogue

G. BOISSONNAULT COMPANY,
MAKERS OF SUPER-SENSITIVE

High Resistance

**WIRELESS
RECEIVERS**

SUPER - SENSITIVE
Superphone
TELEPHONE DEVICES

**MAGNIFYING
APPARATUS**

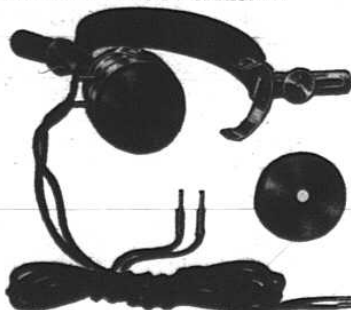
A Set of Receivers offering a Combination of a silent and loud reproduction of Wireless Signals

Efficiency of the Superphone Receivers

Sound is transmitted from one medium to another in vibrating waves. These waves travel in every direction unless they are forced into one particular direction. Attached to the second cap close to the diaphragm is a small round tube, this tube is made so that it fits snugly into the operator's ears. The sound waves are now forced into one direction—the operator's ears. This attachment makes the loss of sound impossible, giving the maximum reproduction. The feature that aids the clear reproduction is the resonant chamber directly below the diaphragm and above the magnet and coils.

THIS CUT ILLUSTRATES THE RECEIVERS WITH HORN ATTACHED

The high tension metal used as a spring forces the receivers close to the ears. The receivers are so attached to the head band that they rest against the ears in a vertical position. This makes it comfortable for the operator.



Patent Pending

Superiority of the Superphone Receivers

The features that are enjoyed by only the SUPERPHONE receivers, that of the LOUD TALKING HORN attachment and the attachment that fits into the operator's ears, make them superior to any set of receivers on the market at present. The construction and arrangement, not to say anything of the matched tones of the two receivers, place them far above the ordinary receivers.

Superphone Receiving Set with Cord and Headband

2000 Ohms	\$12.00
3000 Ohms	15.00
4000 Ohms	20.00
With Horn Attachments as above	\$ 5.00 Extra

High Resistance Loud Talking
Horn Apparatus for Use on
Wireless Instruments
Direct



Model No. 50,
12 In. Long
Price \$12.00

GENERAL MACHINE WORKS

Mechanical or Electrical General Manufacturing, Experimental Work, Telephone and Wireless Parts Manufactured, Tools, Fixtures, Dies, Jigs, Etc., Stamping.

ENGINEERING DEPT. of

G. BOISSONNAULT COMPANY, Inc.

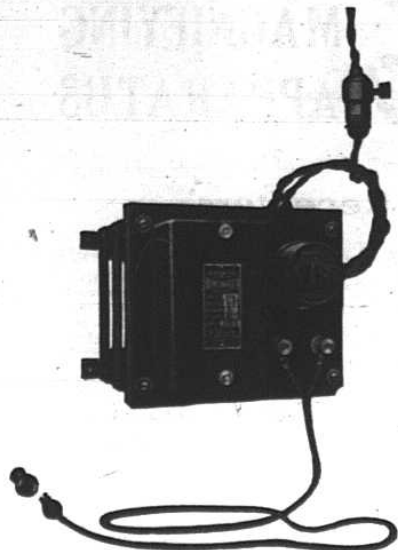
Factory—WHITESTONE, L. I.

26 Cortlandt Street, New York City

WIRELESS AND TALKING DEVICES

named it the "HOMCHARGER." We quote below from the Manufacturer's Bulletin No. 628A, which has just come to hand:

"The Homcharger operates from any domestic A. C. lighting socket, consuming about 1 KWH of energy for



a complete battery charge. It will charge any six-volt battery without removing the latter from its place or disturbing any of the connections.

"The device is self-polarizing, and so may be connected to a battery without any care being taken as regards polarity of leads. The Homcharger has but one moving part, which is subject to very little wear and operates quietly and with absolutely no sparking. The Homcharger never becomes hot, and may be left connected to a battery indefinitely without attention, as the charging current tapers toward the zero value as the battery 'comes up.' This last feature prevents a battery from being overcharged."

It looks as though the Homcharger will fill a long-felt want among radio amateurs.

Bulletin 628A and any further particulars can be had from Messrs. Powley & Moody, Limited, 105 Bond St., Toronto, who are sole Canadian distributors for the device.

EDISWAN TUBES

In reply to many inquiries the editor wishes to announce that the above tubes are made by The Edison Swan Electric Co., Ltd., Ponder's End, Middlesex, England.

BURNHAM & CO.

Catalogue of the above firm has just been received from England. This firm are manufacturers of the well-known line of Burndept Wireless Apparatus. These goods are now available in Canada, a shipment having been received in October by a well-known Toronto firm. The coils especially seem to have aroused the enthusiasm of those who have seen them.

WESTON ESTABLISHES CANADIAN SERVICE STATION

The Weston Electrical Instrument Company have recently established an efficient repair station in Toronto under the direction of their Ontario agent, Messrs. A. H.

Winter Joyner, Limited, 63 Front street west. The service rendered will consist of repairing Weston instruments on a similar basis to the repair department at Newark; namely, that the instruments when repaired will be as reliable as when first purchased and that work will be done as nearly at cost as possible.

This will be a great convenience to the many users of Weston instruments in wireless work, as it will minimize the delay and expense of having to return instruments to Newark for repairs.

The Ontario representatives will be glad to supply literature describing the wireless models and ammeters and voltmeters, including the pyro electric ammeter, which completely eliminates the objectionable features of these instruments based on expansion of hot wire.

SALE OF RADIO PRODUCTS IN CANADA

Many changes have come about in the sale of radio products in Canada. The day was when the sale in Canada of such products was practically controlled by one company or its subsidiaries.

The Canadian amateur, on the lookout for something new and desiring a wider range of choice than that offered by one concern, was obliged to write to the United States or England and take his chances. Sometimes he received satisfaction, but sometimes he found the advertiser in foreign mediums was not familiar with shipments to Canada and delays in clearing at the customs followed, much to his disgust. Or again, after personal inspection, the articles were found unsuitable to his needs or not up to expectation.

Radio products are now being manufactured in Canada by different commercial concerns. Foreign manufacturers and distributors desiring Canadian trade are now advertising their products in Canada. The Canadian amateur can now visit the radio section of the department store or the shops of the various reliable smaller dealers, or again he can confine himself to the Canadian advertising of foreign or Canadian manufacturers or distributors. In following such course he will not go far astray. He may even follow other methods and still meet with satisfaction in his purchases, but on the whole he will find the safest plan to buy Canadian-made products or the products of foreign manufacturers or distributors who have shown their desire and ability to handle Canadian trade either by arranging for the handling of their goods in Canada by reputable dealers, backing such arrangement by judicious Canadian advertising, or by merely advertising in Canada to show their appreciation of Canadian business and the adaptability of their products to Canadian use.

The Canadian publisher is a go-between of great value to the ultimate consumer in Canada and the sales departments of foreign concerns.

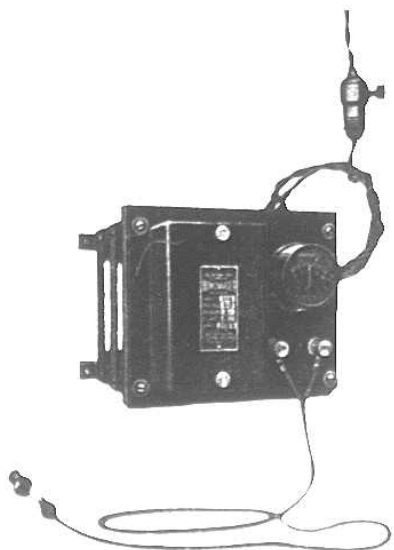
JATH WIRELESS CO.
343 PARKDALE AVE.,
BUFFALO, N.Y.

We carry a complete stock of
Radio Corporation Tubes

UV-200-201

Immediate delivery. Mail orders sent prepaid.

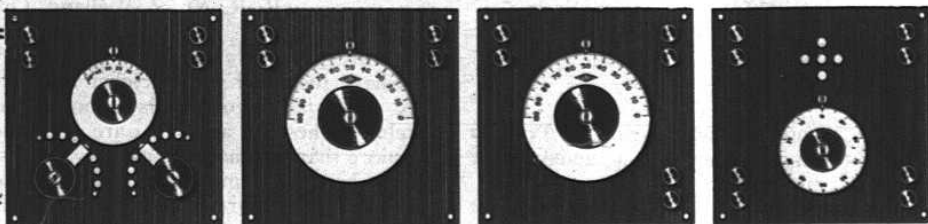
**All Standard Makes of High Grade
Wireless Equipment.**



SALE OF RADIO RECEPTION ANA

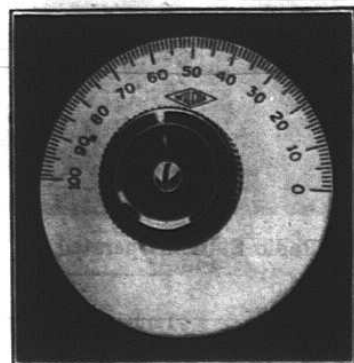
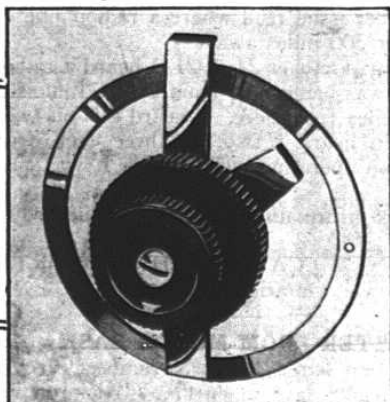
JATH WIRELESS CO

Radio Corporation Tubes



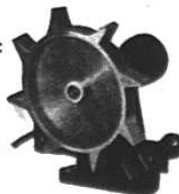
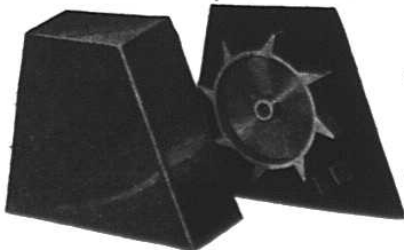
WILCOX Standardized Unit Panels—

form the cheapest, best and most versatile receiver. When coupled together the four instruments shown form a high grade, efficient short wave receiver complete with audion control for only thirty-one dollars. On the left is shown the variocoupler, with fine and coarse primary tuning switches and variable secondary coupling. Next is the grid variometer which controls the wave length from 175 to 450 meters, a range which may be increased if desired by a small fixed condenser. The third instrument is the plate variometer and last is the audion panel with grid condenser, leak, socket, rheostat, etc. The variocoupler and variometers are priced at \$8.00 each and the audion control at \$7.00, all postpaid.



WILCOX Standardized Parts—

make home construction easy. By building your own apparatus from WILCOX parts you can save money, learn more about radio and have instruments as fine as any. They are as great an improvement over "hit or miss" parts as the audion is better than the coherer. No need now to buy a rheostat with one style knob, a switch with another and a dial with a third; neither is there any need of buying parts that are hard to mount, poorly constructed, inefficient or not just what you need. Instead—Standardize On WILCOX Standardized Parts.



WILCOX Rotary Gaps—

have made themselves famous. Known the world over because of their many long distance records.

Send five cents (Canadian coin accepted) for our new interesting loose leaf catalog describing these and other WILCOX products.

THE WILCOX LABORATORIES, LANSING, MICH., U.S.A.

Correspondence from Readers

1020 Avenue B, North, Saskatoon, Sask.,
October 18th, 1921.

Aviation & Wireless News,
Toronto, Ont.

Dear Sirs,—

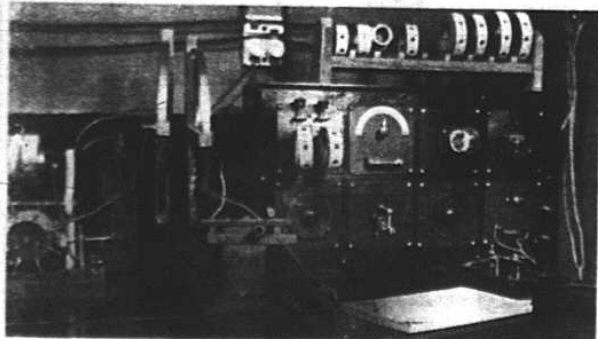
I received to-day a copy of your magazine, Aviation & Wireless News, and enclose herewith a money order for \$1.50 for a year's subscription.

I think it is just what is needed in Canada, and trust the radio section will continue to swell.

Wishing you the best of success, I am,

Yours very truly,

(Signed) THOS. T. FYFE.



Radio Station Operated by Thos. T. Fyfe

Lansing, Michigan, U.S.A.,
November 9th, 1921.

Dear Editor,—

In our opinion, Aviation & Wireless News is a very well prepared magazine. The text matter appears to be of real value, and we think Canadian amateurs are fortunate to have the magazine published for them. We might suggest a few constructional articles, providing that the instruments described have really been constructed and tested.

Very truly yours,

CHESTER M. WILCOX.

Amnrior, Ontario,
November 9th, 1921.

Dear Sir,—

I wish to thank you for the October copy of Aviation & Wireless News, which I received the other day.

Enclosed you will find my cheque for a year's subscription to your interesting magazine, and trust that it will start with the November issue.

I didn't use the subscription blank in this (October) issue, because there was valuable reading matter on the other side.

Yours truly,

CHARLES L. W. FRASER.

Radio, 3 DK.

(Editor.—Last paragraph refers to Dr. Culver's article on Modulation, concerning which many expressions of approval have been received).

R. R. No. 2, Welland, Ontario,
November 7, 1921.

Dear Sir,—

I have just read your October number, not missing a page, and wish to congratulate you on the bumper radio articles. These, I am sure, are welcomed as much if not more than aeronautical events. I presume that is my opinion because I am a research worker, but I can assure you that I take a great interest in the aviation part also. I may say there is not a great lot of room for improving. I also notice that the long-struggling amateur is coming into the spotlight of recognition.

I remain,

Yours for every success,

JOSEPH CLARKE, A.S.M.B.

Dear Sir,—

I am taking your paper Aviation & Wireless News, and in September issue read where a radiophone concert was heard over 500 miles away.

Last Monday, October 24, 1921, I heard a radiophone concert which was being sent from Cairo, Illinois, a distance of 645 miles from here. I heard this on two bulbs loud enough to hear it two or three feet from the phones. Station operating was 9 HB. It was clear and distinct.

Hoping this information may be of some use to you.

Yours truly,

CARLYLE HEMSWORTH.

Box 585, Listowel, Ontario.

LETTER FROM MORSE, SASK.

A subscription letter, dated November 9th, received from Morse, Sask., says in part: "Article on modulation by Dr. Charles A. Culver is good. We are enclosing card with description of our station."

"We are greatly pleased with results so far, receiving reports from all over country in radius of 800 miles and being first Canadian amateur to get over the Canadian Rockies to Vancouver, B.C., 5 CZ reporting our sigs QSA. We are working with numerous U. S. stations in North and South Dakota, Montana and Denver, Colorado, the latter 775 miles air line, and we have no trouble working them most any time.

No one in Vancouver, B.C., at present can get back to us, but we are in hopes that the B. C. Radio Association will soon install a C. W. transmitter to reach here, also that some one in Winnipeg will get to us and east to Ontario, so we can get a Canadian transcon, going.

"We would like to test with some of those good Ontario stations, and if they can get in here QSA would consider strengthening our C. W., so as to reach back if possible. Would also be pleased to have any one hearing our sigs drop us a P. C. We are working on 195 to 200 meters straight C. W., 10 watt.

"We hope to have 'fone' going by Saturday night. Will also add R. F. amplifier in addition to two-step A. F. amplifier we now have in short time."

Yours truly,

J. E. MAYNARD, Radio 4 CB.
Box 339, Morse, Sask.

P.S.—We are new at the game, but can copy the average amateur. Father and son working together. O. M. about 25 years railway telegraph operator.—J.E.M.

Description on card referred to above is as follows: "My transmitter, 2 UV 202 tubes 10 W.C.W. Trans. aerial 4 wire fan 80 ft. direct to switch, wave length 185 to 200 M., radiation 1½ amps. My receiver, long wave, H. C. coils; short wave, reg. variometer type Clapp-Eastham parts; Audion det.; 2 stage A. F. amplifier, all home-made. Baldwin fones rec. aerial break in 125 ft. long 1 wire. Our power cuts off 1 K a.m."

McDonald's Corners, Ont.,
November 16th, 1921.

Dear Sirs,—

Herewith find enclosed a postal note for —. I think if you set apart a column for telling when radiophone stations worked, also on what wave length, so that all amateurs would be sure of something. A Question and Answer department would be a good addition.

Yours for a great big Canadian wireless magazine.
ELLIS E. LITTLE,

Radio 3 PL.

P.S.—I heard Pittsburgh (KDKA) last Saturday night. I used a home-made coupler, galena crystal and Brandes Superior phones.—E. E. L.

CONCERT AT SAN FRANCISCO HEARD CLEARLY AT EDMONTON

Mr. D. C. Jones, druggist and stationer, of Vulcan, Alberta, and a subscriber to Aviation and Wireless News, writes under date of November 1st, 1921, as follows:

"I am enclosing clipping which might prove of interest to you.

"Regarding my own set, which you mentioned in your letter. I have not as yet had a reply to my inquiries from the — (dealers), but have found by using larger coils in my tinkle I have been able to pick up the concert programme mentioned in the enclosed clipping. Did not come in very strong, and therefore found it very hard to tune to, but I am adding another step of amplification, and I think that my set will then be more satisfactory. Thanking you for the interest shown. I remain, etc."

The clipping referred to, which is taken from the Calgary Albertan, is as follows:

"A new world's record in land transmission of wireless telephony has been achieved by W. W. Grant, wireless engineer for the Dominion Government, who is stationed at High River, when he established communication between Edmonton, Alberta, and San Francisco, a distance of 1,400 miles, in a test made in Edmonton Saturday night.

"Mr. Grant, who was in Calgary last night, told The Albertan that the test was very satisfactory. A concert programme being sent out by wireless from San Francisco was picked up and recorded distinctly at Edmonton.

"Mr. Grant made the test in connection with others he has been conducting to establish the feasibility of a wireless service into the Fort Norman oil fields and other outposts in the north country. In the test with San Francisco songs and instrumental music were heard plainly, also remarks by the chairman at the concert in the far south city.

"Mr. Grant is at present located at High River, where recently he conducted a satisfactory test communication

with San Francisco. The wireless station at Edmonton has a splendid natural location, being on the high banks on the south side of the river."

(Editor's Note.—Mr. F. K. D'Alton, secretary Radio Research Club of Canada, states he hears Frisco quite distinctly at his home in Toronto.)

WESTINGHOUSE BROADCAST

R. H. Spaulding, of the radio sales department of the Westinghouse Electric & Manufacturing Company, located at 10 High Street, Boston, Mass., wishes to announce that a similar service to the one recently inaugurated at KDKA, East Pittsburgh, Pa., will be established at the company's East Springfield, Mass., plant. The call letters are WBZ, and they will broadcast information and phone concerts on a wave-length of 425 meters at 8 p.m., local time, on a 1-kw tube set.

SHANGHAI RADIO STATION

A new high-powered radio station is under construction at Shanghai, China. The six steel masts, which are 1,000 ft. high, are much higher than the Eiffel Tower, which is the most lofty structure on earth. The highest radio tower now in existence is the one at Bordeaux, France, which is 820 ft. high.

RADIO MAP OF CANADA

Lack of space has made it imperative to hold over till next issue the appearance of the first section of the above map. The editor was loath to do this, as so many favorable comments had been received regarding the map; but on the other hand, there was so much timely information which could not be held back, that no other course was possible.



You Can Rely On

RELIABLE
TRADE MARK

Wireless Batteries

THE quality and dependability of Reliable Wireless Batteries has become a byword with wireless men.

It is the buy-word for the largest Wireless Companies as well as for professional and amateur wireless operators.

Reliable Wireless Batteries were pioneers in the wireless field. Their constant and lasting service won instant favor. Highest grade materials, and thorough tests before leaving the factory ensure that every Reliable Wireless Battery will merit that favor.

May we mail you the Reliable Wireless Battery List of prices and descriptions?

Manufactured only by

The Dominion Battery Co., Limited
MONTREAL — TORONTO — WINNIPEG

RADIO CLUB REPORTS

On this section the Editor will be pleased to publish reports of any of the various Radio Clubs. Such reports should be submitted in the exact form in which they are to appear, the Editor, however, reserving the right to edit and curtail the reports if necessary. Papers of special interest read before such Clubs will be also acceptable for publication.

RADIO RESEARCH CLUB OF CANADA

Particulars as to the above Club will be found elsewhere in this issue. Meetings are held every third Thursday, at which special papers are read by men who are well qualified to speak on their chosen subjects. These papers are being published in Aviation and Wireless News. Last issue contained Dr. Culver's paper on "Modulation," concerning which we have received many favorable comments from different parts of the Dominion. This issue contains the paper read at the Club's last meeting by Mr. Galbraith, which should be of interest to many, especially as the information it contains has never before been given out for publication. The next meeting will be Thursday, November 24th, when Mr. W. C. C. Duncan will give his paper on "Antenna Reactances."

WIRELESS ASSOCIATION OF ONTARIO

By 3 GK

The last general meeting of the W. A. O. O. was held on Thursday evening, October 27, 1921, in the north School of Science building. The minutes of the previous meeting were read and adopted.

Mr. Moody of the firm of Powley & Moody exhibited a storage battery charger called the Homcharger. Mr. Moody drew a working diagram of the charger on the board and pointed out the several distinct advantages of this machine.

The chairman next called on Mr. Leslie to show and say a few words about his radiophone inductances. Mr. Leslie did this in a very interesting way.

Mr. Russell then mentioned the transatlantic preliminaries which were to come off on the nights of Nov. 1st to the 6th.

Mr. Russell also mentioned the interesting work that can be done with small-loops, and urged some of the members to construct them and try them out. This was followed by a relation by Mr. Moor of some of his interesting experiences using loops for DX receiving.

Mr. Galbraith next gave an interesting talk on some of his results obtained by using 25 cycles on the plate of transmitting bulbs, followed by a detailed description of the design of a transformer for use in connection with 25 cycles on plate as used at Canadian 3 DE.

Next followed nominations for a club sales manager, which were withdrawn in favor of a club auctioneer, namely, Mr. Keith Russell, as at some future meeting an auction sale of old junk will be held, Mr. Russell presiding.

An announcement was then made by the chairman that the firm of Powley & Moody had very kindly offered a Homcharger as a prize for the best delivered lecture or talk on any subject before the club. This was unanimously accepted with thanks by the members of the club.

After a very lengthy discussion of the proposed receiving contest, Mr. Galbraith moved that the executive draw up a set of rules and regulations to be presented

to the club at the next meeting. This motion was seconded by Mr. Fowler and passed.

Moved by Mr. Russell, seconded by Mr. Young, that the executive take full charge of the contest. Passed.

A discussion on motor-rectified A.C. and on loops followed.

Moved by Mr. Russell, seconded by Mr. Smith, that the meeting be adjourned. 10.15 p.m.

Number present, 107.

W. CHOAT, Sec. Treas.

Notes

A new route has been established for traffic between Chicago and 1st District. This is through Chicago to Ontario (3 BP v 3 JL) to New York.

A new record for traffic in Ontario is 345 messages during the past month.

Great preparations are being made for a receiving contest, which is to take place at the meeting of the Wireless Association of Ontario which is to be held on the 8th of December. If any of you fellows want to get in on it join up before that meeting and cart along your tuner and detector. A standard amplifier, aerial, ground and "A" battery will be supplied by the club. Points are to be given as follows:

Signal Strength	50 pts.
Appearance	10 "
Selectivity	20 "
Adjustment	10 "

Total 100 pts.

The members present are to be the judges.

GENERAL MEETING W. A. O. O.

The regular meeting of the Wireless Association of Ontario was held in Room E 25 of the S. P. S. Building, University of Toronto, on Nov. 17th. About 100 members turned up despite the very rainy weather conditions prevailing on that evening.

A very interesting talk was given on the use of 25-cycle alternating current for wireless telephone work by Mr. Galbraith of Radio 9 AJ.

Mr. Pipe gave a short sketch of the "Chicago Plan," and recommended that a similar scheme be worked out for this district.

Mr. Russell (9 AL) displayed a new receiver of compact and pleasing appearance. The device was passed around for intimate inspection by the members.

The president outlined the tentative rules for the proposed receiving contest, and these were in the main accepted by the members, and by a general vote it was decided to hold the receiving contest on December 29th. There are eight entries so far in this contest, and all persons interested in it can obtain full information from the secretary, Mr. W. F. Choat, 241 Robert St., Toronto.

The members voted to have an auction sale of radio "junk" at the next general meeting, December 8th. It is hoped that all members will contribute to the success of this sale by bringing their unwanted apparatus to the

meeting. Reserve bids will be allowed. Mr. Russell (9 AL) will be auctioneer.

The president spoke at some length about the QRM conditions in Toronto district. A great many amateurs have been disregarding the Club traffic regulations, and so causing much bitter feeling on the part of serious workers, whose efforts along research lines have been greatly hampered by thoughtless amateurs who use more power than is necessary when working over short distances, and who cannot wait for the 10:30 p.m. line, when long distance work is permitted.

The president's remarks seemed to open the pent up feelings in several quarters, and a very stormy two hours were spent in heated discussion of the QRM situation. As the most important speaker of the evening had yet to be heard from, the chairman was obliged to regretfully close the subject of QRM and leave it over for some future meeting.

Mr. W. C. C. Duncan, official delegates to the Eighth District A. R. R. L. Convention in Buffalo, then gave his report, which appears elsewhere in this journal.

The meeting adjourned at 11:15 p.m.

Next meeting will be held December 8th, 1921. Don't forget auction sale on that date.

HUB CITY RADIO CLUB (SASKATOON, SASK.)

The above club is beginning to do big things. At a meeting held on November 9th in the local Y.M.C.A. about fifty members were present, and after the meeting was opened by Mr. Turner of the Y, several members gave their views on the future club activities.

Mr. Vogel and Mr. Nankenson, both of the club, installed their outfits in the Y and the members had the opportunity of listening-in on San Francisco and New Brunswick, N.J., by means of these sets and a magnavox loaned by a local music store.

The club then had code practice by means of the magnavox and an omnigraph until it was time to break up.

Permanent club rooms are being obtained in the Y.M.C.A., and there the club intends installing a code practice table and a complete receiving and C. W. transmitting set.

1020 Avenue B., North, Saskatoon, Sask.

November 10th, 1921.

The Editor, Aviation & Wireless News.

Toronto, Ont.

I enclose herewith a photograph of my set which I built myself. It consists of a Clapp-Eastham 1/2 K. W. transformer with O. T. and rotary gap. The receiving end uses honeycombs and a single V.T. As it is installed in a small cabin at the back of the yard I could not get all the set in the photograph, but you may be able to find a use for it in your paper.

In closing, let me say that the October issue of your paper was just great, and let's have more like it.

Wishing you the best of success, I am,

Yours truly,

THOS. T. FYFE

BRITISH COLUMBIA RADIO ASSOCIATION

Vancouver, November 9th, 1921

Mr. C. A. Lowry, 219 Robert Street, Toronto, Ont.

Dear Sir:

The local radio club, of which I am Traffic Manager has undertaken to organize a Trans-Canada Radio Relay League, and we are after everybody prominent in amateur circles for their support.

We would greatly appreciate hearing from you on this matter, and if you have any helpful suggestions for the promoting of this league we are ready to receive them.

The club out here is getting into winter stride now, and there is a greatly increasing interest being taken by local amateurs.

A little notice regarding this proposed plan would do no harm and maybe a lot of good if it appeared in "Aviation & Wireless News." Can you see to that for us? Our mail address is Barron Hotel, Vancouver, B.C.

Yours truly,

WM. D. WOOD, Radio 9 BD.
219 Robert Street,

Toronto, November 18, 1921.

Dear Mr. Wood:

We were much pleased to receive your kind letter of November 9th, in which you suggest the formation of a Canadian Relay League. I assure you that we sympathize with our Western brethren in their desire for an All-Canadian transcon. But I am afraid that your Western air has over-filled you with optimism. We have strong reason to believe that a purely Canadian transcon. route is an impossibility at the present time owing to the great stretch of iron-bound terrain that separates Winnipeg from 3rd District amateurs. Owing, presumably, to heavy ore deposits in the Lake Superior region, the Commercial station at Sault Ste. Marie, Ont., has almost continual difficulty in working through to Fort William even on 5 KW. What hope can the poor amateur have until the district shall have become more densely populated and numerous stations established?

And even in the more populous districts we have many "loose ends." There is no connection between Toronto and Sudbury, and from the latter point northward and westward, we believe, there is not even one private station except in Sault Ste. Marie.

We are now endeavoring to establish reliable relay routes from Toronto to Windsor, Ontario, in order that we may get in touch with Western Canada through the northern states routings of the American Radio Relay League.

The A. R. R. L. has been most kind and friendly toward Canadians in this district, and indeed we are proud to say that the W. A. O. O. is affiliated with the A. R. R. L., and that great organization is co-operating with us as fully as we could wish.

If you have not already done so, we suggest that you get in touch with the Hartford headquarters of the A. R. R. L. and make your efforts international in scope.

In any case, we assure you of a most hearty co-operation in everything that gives the boost to Radio. We most cordially solicit an interchange of ideas with your Western members. Let us know what you are doing out there, fellows, and let us get together—through the A. R. R. L. and—by the way, send in your club reports to Aviation & Wireless News. We will see that they are not overlooked.

73 ms.

Yours sincerely,

CHAS. A. LOWRY,

President W. A. O. O.

Radio 9 A.V.

Editor's Note.—The writer had the pleasure of meeting Mr. K. B. Warner, of the A. R. R. L., during the Buffalo Convention. Mr. Warner discussed at length the Canadian situation and was particular to emphasize what we always felt to be the case, namely, that the attitude of the A. R. R. L. towards Canadian amateurs

was merely that of a "helping hand" till such time as Canadian geographical obstacles were overcome. Mr. Warner pointed out some of the many ways in which Aviation & Wireless News could be of benefit to Canadian radio amateurs, and so be to Canadian amateurs what QST has been to our cousins to the south. Mr. Warner's suggestions were very much appreciated, and we expect to have an announcement from him for next issue. In the meantime we invite correspondence on this very important question.

SPARK QRM

The following letter, clipped from the Radio section of an American newspaper, contains information of such a timely character that we reprint it bodily:

"Editor: Cannot something be done to induce the 'sparks' who are continually causing QRM to the phone broadcasts of 1XE, KDKA, and others, to show some respect for some one beside their own selfish desire to be heard?"

"Could not some of the radio associations take this matter up and reduce this interference with the pleasure of the great majority before a movement is started to induce the government to put the 'sparks' out of business entirely?"

"The 'sparks' interfere so much that they should be more careful of their QRM."

"Editor's Note.—At the present time there is a campaign to cut down interference caused by all classes of amateur stations. The Department of Commerce is beginning to take a more active part in regulation of amateur stations."

CHATHAM RADIO CLUB

Among the amateur licenses issued in October was one to the above club, whose mail address is care of The Central School, Chatham, Ontario. Mr. F. J. Collins is the operator in charge. Call signal is 3 RA, with a wave length of 50 metres.

WESTMOUNT HIGH SCHOOL RADIO CLUB

The above school, which is situated on Academy Road, Westmount, Quebec, has its own radio club and set operating on a wave length of 50 metres. Call signal is 2 EB.

PRINCE RUPERT RADIO CLUB

In Prince Rupert, B.C., is a live club. They have their own set operating on a wave length of 50 metres with call signal 5 AW. Communications by mail should be addressed to S. J. Anderson, Box 1644, Prince Rupert.

OTTAWA RADIO ASSOCIATION

Mr. A. R. Gladden, 405 Wellington St., Ottawa, Ont., is the operator in charge of the set of the above club. Call signal is 3 OQ on a wave length of 200 metres.

SUNDAY LEADER RADIO CLUB

Major K. S. Rogers, holder of special license. Call Signal 9 AK, reports from Charlottetown, P.E.I., as follows:

"I may say that we are taking steps to organize the Maritime Provinces as an important radio district, and the Sunday Leader Radio Club is the nucleus of this arrangement. I have been appointed traffic manager of the club."

"My own station, 9 AK, has already worked 1 ZE at Marion, Mass., as well as several other amateur sta-

tions in Maine. I have a special license authorizing me to use two hundred metres."

Major Rogers' address is care of Canada Life Assurance Co., Charlottetown, and those interested are asked to communicate with him as soon as possible.

LONDON, ONT., Y.M.C.A. RADIO CLUB

This club are operating their set on a wave length of 100 metres with call signal 3 QH. Mr. R. H. Gurd is in charge.

OTTAWA Y.M.C.A. WIRELESS CLUB

Correspondence by mail to this club should be addressed to Ave. and Metcalf St. Call signal is 3 BY on a wave dressed to the president, Mr. A. C. Allin, corner Laurier length of 200 metres.

AMATEUR RECEIVING SETS MUST BE LICENSED

Owing to the fact that some amateurs are under the impression that receiving sets alone do not require to be licensed, the editor procured an announcement from Ottawa. The cost of a license till the end of 1922 is only one dollar, so get in line with the law. The following is the letter from Ottawa:

Ottawa, 22nd November, 1921.

Sir,—

In reply to your letter of the 17th instant, I beg to inform you that all Radiotelegraph Stations in the Dominion of Canada, whether used for "reception and transmission" or "reception" only, must be licensed by the Department of the Naval Service.

In this connection I would draw your attention to Section 3 of the Radiotelegraph Act, Statutes 1913, Chapter 43, which reads as follows:—

"No person shall establish any radiotelegraph station or install or work any radiotelegraph apparatus in any place in Canada or on board any ship registered in Canada except under and in accordance with a license granted in that behalf by the Minister."

We appreciate the fact that various radio clubs are anxious to help the Government as much as possible in seeing that all amateurs comply with the Radio laws of the Dominion and the Department, in addition to being pleased with their co-operation, is anxious to afford amateurs all possible help in their work by granting them as much latitude as possible compatible with the proper protection of the commercial, aid to navigation, and other more important services.

With reference to the last paragraph of your letter, I would state that your publication is on our mailing list to receive any announcement of interest to the Radio Amateur.

I am, Sir,

Your obedient servant,

G. J. DESBARATS,

Deputy Minister.

C. F. Williams, Esq.,

Editor, Aviation & Wireless News,
60-62 Adelaide St. E., Toronto

NEW EXPERIMENTAL LICENSE

W. Y. Sloan, 3 CA, 167 Close Avenue, Toronto, has just received an experimental license with call signal 9 BJ, and wishes anybody hearing his signals to be good enough to report to him with comments.

SOLDERING--Materials and Methods

By J. J. McWatters, Radio Department, T. Eaton Company, Limited.

The average person does not usually succeed very well with his first attempt at soldering. Often he lays the blame for the failure on the material he is using, which is usually good enough, and not on his lack of knowledge of the subject. In this brief article the writer sets down a few simple rules, which, if adhered to, will aid any intelligent person to become expert in the art.

Here are the essentials for successful soldering:

First, you must have clean the surfaces to be soldered.

Second, you must use some good acid to remove the dirt and oxide from the metals to be soldered, and also to remove any grease that may be adhering to the surface.

Third, you must learn how to heat the soldering copper properly.

Fourth, you should learn the component parts of solder; the degrees of heat required to melt solder; the difference between soft and hard solder; and how to prepare the acid or flux for soldering various metals.

Cleaning:—Rub with sandpaper or emery cloth (a file, knife or buffing wheel will do) until all corrosion and dirt have been removed and the metal shows up bright and clean. This applies to all metals. It is almost impossible to solder a dirty joint.

Acids:—There are many kinds of acids or flux on the market in paste form which are very good for soldering brass, copper, zinc and tin. Any of the well-known pastes are sold cheaper than you could make them. Twenty-five cents will buy a quarter pound, which is sufficient for the ordinary use of the experimenter for a long time. Apply the paste to the work to be soldered, using a small stick or the end of your finger, spreading as evenly as possible. Do not use too much. A piece the size of a match head, if properly applied, will be enough for the average joint. Of course some joints may require more and some less, when the heat of the soldering copper is applied, the paste runs evenly over the surface. Although all of the above applies to zinc, a softer solder must be used. Further in this article the formula for making this solder is given. For good results when soldering copper or brass to iron or steel, or when soldering galvanized iron, acid made up and used as described below, should be used. Tanners frequently use resin on galvanized iron and tin roofing with good results. Put any desired quantity of sulphuric acid into a bowl, crock or glass. Add pieces of good, clean zinc as long as the acid will dissolve it. Then let the solution cool, and if any dirt has got into the mixture, strain through a fine cloth into a bottle, and cork well. Do not breathe the fumes arising from the bowl while you are putting in the zinc, as they will give you a headache. Apply this acid with a wire or stick, and use care to keep it out of cuts or sores, as it will prove uncomfortable for a while if it enters same. Use only on galvanized iron, or steel, or when soldering brass or copper to iron or steel. It is too strong for use on brass, copper, zinc or tin.

Heating:—If convenient, heat the soldering copper in a gas fire or the flame of a gasoline glow torch. If a coal fire is the only kind available, use it, but wipe off the soot before using.

The only sure sign that the soldering copper is hot is when light green flames show all around the end of the copper. Then remove it from the fire and immedi-

ately apply to the work, adding solder as needed. For the beginner good wire solder is recommended. When too cold to cause the solder to flow freely repeat the heating operation. Sometimes the soldering copper needs retinning, as the tin is burnt off by overheating. If this happens, heat in the usual way, dip into the acid, and quickly rub over a bar of pure tin. If a bar of tin is not at hand, rub over an old can or other tin vessel, and the same results may be accomplished. Be sure that the soldering copper is hot enough to melt portions of the tin.

Solder:—Common solder is made from equal parts of lead and tin. Fine solder contains two parts tin to one part lead; cheap solder two parts lead and one part tin. The melting points of such tin-lead alloys are as follows:

1 part lead and 1 part tin	370° Fahrenheit
2 " " 1 " "	441° " "
1 " " 2 " "	340° " "
1 " " 1.5 " "	334° " "

Pure tin melts at 450° Fahrenheit.

Solder made according to the last named combination in the table above may be classed as soft solder, and is intended for use on metals having a low melting point, such as zinc.

WESTINGHOUSE BROADCASTS

The following information regarding these important broadcasts came to hand a few days ago. The editor is under the impression there has been a slight change in schedule, and if so same will be officially verified and appear in next issue. In the meantime we submit this schedule:

Station WBZ, East Springfield, Mass.—Broadcasts on Monday, Wednesday and Friday evenings from 8 to 9, regular talented music, no "canned" music. On Sunday evenings, 7:30 to 8:30, church services. Wave length, 375 meters.

Station WJZ, Newark, N.J.—Wave length, 360 meters, broadcasts "canned" music every evening from 8:30 to 9:30.

Station KDKA, East Pittsburg, Pa.—Wave length, 330 meters. Maintains what is perhaps the most extensive broadcasting schedule of any station on the Atlantic coast.

At 7 p.m. each day, Eastern standard time is indicated by the ringing of a gong, the service being obtained from the Washington Observatory. At 8:30 p.m. the Government market reports are broadcasted. "Canned" music starts at 9:05 p.m. and is continued until 9:30 p.m., at which time the news broadcast is begun. This service is transmitted on Monday, Wednesday and Friday evenings only. From 9:35 to 10 p.m. both instrumental and vocal music is sent and furnished by professional talent. At 10 p.m. the questions and answers broadcast is started. Every Saturday night at 8:15 and on every Sunday afternoon at 4 the Einheirreth organ recitals are broadcasted, the service being connected at Carnegie Hall, Pittsburgh. Every Sunday evening from 7:45 to 9 church services of the Calvary Episcopal Church are broadcasted.

The various stations furnishing these broadcasts would greatly appreciate receiving cards from those who hear them, with suggestions, and also reports on fading, modulation and any other information which would be of assistance to them in improving the service. This is the amateur's chance to do his part in the broadcasts.

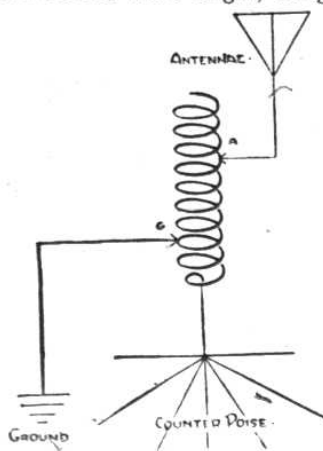
COMBINATION OF EARTH GROUND AND COUNTERPOISE OR CAPACITY GROUND USED AT MODERN EXPERIMENT STATIONS

The accompanying diagram shows a combination of a buried wire ground with a capacity ground (counterpoise) for more uniformly distinguishing earth currents. By adjusting contacts G and C in the figure the total antenna current may be distributed between the capacity ground and the buried wire ground in any desired ratio.

As an illustration of effectiveness of this balanced ground, the following data was observed at the station 2BML, using the above method. The resistance of the antenna system using a regular earth ground, consisting of buried wires, was 60 ohms at a wave length of 280 meters. Upon substituting a 4-wire counterpoise, consisting of four No. 14 B. and S. copper wires spaced four feet apart, placed directly beneath the antenna flat top and extending several feet beyond it at each end, the antenna resistance was lowered from 60 to about 10 ohms.

By combining the earth ground with the counterpoise, as shown in the figure, the antenna resistance was still further reduced to about 4 ohms. Since it is desirable to reduce the antenna resistance as much as possible, both from the standpoint of sharpness of wave and also of maximum antenna current, the illustration should be sufficient to start some of us experimenting with our ground system.

It will take a little experimenting on the part of the amateur to obtain the proper balance of the antenna system. As a suggestion it might be well to first tune the antenna to the desired wave length, using the counter-



poise alone, then try the ground clip on different turns of the helix until the resulting wave length is the same as with the counterpoise. The proper adjustment is had when moving either the ground connection or counterpoise connection will not change the emitted wave length, but merely cause a change in the resistance on the antenna system.

We all know that the antenna ammeter is the greatest deceiver in wireless. About the only excuse for its presence is the fact that it is a means of indicating resonance between two circuits. In the above system the experimenter has to be even more careful in interpreting its readings than with the single ground transmitter. Keep in mind that the total antenna current will divide between the ground and the counterpoise in a ratio that will be inversely proportional to the effective resistances of the ground and the counterpoise; that is, the branch of the ground system that has the highest resistance will exhibit

the least current. Try it in both branches and compare the readings. It will be well to actually compare distances transmitted with this new system as compared to your old single ground and not put too much faith in the needle on the hot-wire ammeter. Credit for this idea belongs to Mr. Alexanderson of the Radio Corporation and H. H. Beverage for adaption to short-wave transmitters.

WAKE UP TO WIRELESS!

The editor of Popular Science Monthly says in a recent issue: "Wake up to wireless! Do you realize that the use of radio outfits for entertainments in the home is spreading through America like wildfire? Do you know that there are nearly half a million fans in the country to-day and that the thing has just started? If you aren't awake yet to the recreation you can get from a wireless receiving set—the concerts, dance music, news and public speeches it will bring you"—then you are missing one of the greatest treats which modern science has to offer.

The oncoming of winter marks the opening of the greatest season in the history of the radio amateur.

The opening of a radio department by the largest departmental store in the Dominion marks another step forward for the Canadian amateur and puts him on an equal basis with that of the American amateur.

Despite the fact that the history of radio telegraphy and telephony is an old story, many yet fail to realize the recreation they can get from a low-priced receiving set.

Every afternoon on a wave length of 200 meters musical concerts are sent out by the T. Eaton Co., Ltd., (Toronto).

Tuesday evenings, from 8 p.m. till 10 p.m., the Marconi Co. (Toronto), send out concerts on a wave length of 1,200 meters.

The Canadian Independent Telephone Co., Ltd., (Toronto), are advertising elsewhere in this issue their concert programme.

Concerts and church services are regularly broadcast by the Westinghouse Co. from East Pittsburgh and other stations. These are regularly picked up by a large number of Toronto amateurs on ordinary crystal detector receiving sets.

The cost of such a set should be from \$25.00 to \$45.00. This set would consist of an aerial of one wire, 150 feet in length, or of two wires 75 feet each in length. This wire may be obtained at from fifty-five cents per 100 feet up. One Galena crystal would cost thirty cents, one Galena crystal detector will run from \$1.25 to \$4.75. One pair of Murdoch two-thousand ohm receivers sell in Canada for \$6.50. Then there will be required a receiving transformer or tuning coil, which costs in the stores any way from \$4.50 up. This latter can be made by the amateur in the following way: Two drums are required and may be made from one-sixteenth inch cardboard; the primary to be $5\frac{1}{2}$ inches long and 4 inches in diameter, wound with 247 turns of No. 26 double silk or single cotton-covered wire, tapped every ten turns; the secondary to be $5\frac{1}{2}$ inches long and $3\frac{1}{2}$ inches in diameter, wound with 350 turns of No. 30 S.C.C. or S.S.C. wire. This coupler with ordinary sized antenna should tune up to 2,500 meters.

GARDEN CITY RADIO ASSOCIATION

At St. Catharines, Ont., there is a live young association, of which Mr. R. Averell is secretary. Like many other Canadian clubs, they are successful in hearing KDKA and other American broadcast stations.

AERO CLUB OF CANADA

The first annual Aero Club Ball will be held January 6th next at Jenkin's Art Galleries, with Jardine's Orchestra in attendance. A special committee has been appointed, consisting of chairman, W. F. Sparling; vice-chairman, E. A. McKay; committee: Colonel Gibson, Capt. Hagarty, Messrs. Willows and Purvis. Arrangements are now being made and particulars of same will appear in next issue. The above date was considered a suitable one for many non-resident members who may be at their old homes in and around Toronto during the Christmas season.

It has been decided to hold a Card Tournament, commencing December 7th, both among Club members and also with some other club.

An endeavor is being made to secure for the Club quarters autographed photographs of prominent com-

manders and officers of the Allies in the late war. General Currie has already kindly acceded to the Club's request.

Capt. Dudley Hagarty has been appointed Director, to fill the place formerly occupied by Mr. Herington. Mr. Lloyd Fleming was recently appointed to this position on the Directorate, but could not see his way clear to accept.

Colonel Gibson was appointed by the Club to meet Earl Beatty on his visit to Toronto.

Every Wednesday evening is a special night at the Club. Cards and other forms of entertainment are provided. The editor of Aviation and Wireless News is arranging a Wireless Concert for some future Wednesday evening.

The following additional applications for membership were received and accepted by Directors on November 23rd: K. S. Rankin, Capt. Ralph W. Young, Kenneth Freeman, Capt. H. A. Blake and Corp. G. C. Currie.

AERO CLUB OF CANADA GROWING STEADILY

The following applications for membership have been received and accepted within the past two or three weeks:

John A. Yarker, 135 Silver Birch Ave., Toronto.
J. D. Smith, 298 Lauder Ave., Toronto.
Ernest Berry, 58 Columbine Ave., Toronto.
G. M. Saunders, 91 Hilton Ave., Toronto.
R. P. Stewart, Commodore Hotel, N.Y.
Frank Harold Duncan, 292 Russell Hill Rd., Toronto.
Geo. Wm. Bayly, Box 312, Port Credit.
D. P. MacDougall, 23 Toronto St., Toronto.
W. J. E. Johnston, 12 Park Ave., Toronto.
Hugh Beatty, Port Credit.
Wm. A. Fairlie, 10 Hampton Mansions, 79 Winchester St., Toronto.
Gerald M. Brawley, 223 St. John's Rd., Toronto.
H. A. Hornell, Mimico, Ont.
Thos. C. McKechnie, Mimico Beach, Ont.
Kenneth M. Smith, 298 Lauder Ave., Toronto.
Herbert B. Ray, Jr., 35 Abbott Ave., Toronto.
C. M. Sparling, 33 Jackman Ave., Toronto.
Gilbert C. McMurdo, 35 St. Mary St., Toronto.

CANADIAN AIR FORCE HOLDS FIELD DAY AT CAMP BORDEN

A gravel sport field day was held here October 27th by the Canadian Air Force, with the following results:

100 yards—1, Flying Officer A. Tapping; 2, Air Mechanic H. Bryden; 3, Flying Officer A. A. Ruddles.

120 yards hurdles—1, A.M. J. W. Markle; 2, Flying Officer A. Tapping; 3, Air Mechanic J. Cameron.

220 yards—1, Air Mechanic H. Bryden; 2, F. H. Allan; 3, First Air Mechanic D. Hobson.

440 yards—1, First Air Mechanic J. W. Markle; 2, Air Mechanic H. Bryden; 3, Flying Officer A. Tapping.

One mile—1, B. Barton; 2, Corporal Widberley; 3, Air Mechanic Patterson.

Wheelbarrow race—1, H. Gill and B. Barton; 2, R. M. Mutter and Air Mechanic Patterson.

Standing:—Stores depot, 23; E. R. S., 14; G. I. S., 9; A. R. S., 4; A. flight, 3; headquarters, 1.

When Money is Tight

Practically all classes of investments—bonds, stocks, debentures, real estate—depreciate in value to a ruinous extent. Investors are often forced into bankruptcy at such times through conditions over which they have no control.

But an Imperial Life policy never depreciates. On the contrary, it continues to increase in value during week-days, nights and Sundays, from the time it is issued until its maturity, no matter what business conditions or the state of the money market may happen to be.

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THE UNDERMENTIONED OFFICERS HAVE COMPLETED A TOUR OF DUTY DURING THE MONTH OF OCTOBER, 1921:

Rank	Name	Address
F. O.	Logan, George Colin.	210 McDonnell St., Peterborough, Ont.
Flt. Lt.	Helmuth, Frederick Gordon.	5 Clerry Ave., Toronto, Ont.
P. O.	Wenlsey, Harold.	Birsag, Saskatchewan.
P. O.	McDonald, Alexander Hugh.	148 Hastings St. E., Vancouver, B.C.
P. O.	Robarts, George Dickson.	10,044 86th Ave., Edmonton, Alta.
P. O.	Trenholme, Robert Gilbert.	Coaticooke, P.Q.
Flt. Lt.	Goldston, Jack J.	1324 Montagne St., Regina.
Flt. Lt.	Roohouse, Albert Edward.	113 Centre St., Ottawa, Ont.
F. O.	Balmer, Harold Frederick.	917 Dovercourt Rd., Toronto, Ont.
P. O.	Burnett, Robert Fraser.	332 MacKay St., Montreal, P.Q.
P. O.	Laxdal, Joseph.	502 Maryland St., Winnipeg, Man.
P. O.	Maltby, Albert Stanley.	315 High Park Ave., Toronto, Ont.
P. O.	Vaillant, Frank.	131 Elgin St., Ottawa, Ont.
F. O.	Ryder, Frank Herbert.	St. Stephen, N.B.
F. O.	Burke, Thomas William Lorne.	Yorkton, Sask.
P. O.	Holst, Sydney W.	59 1st St. S. W., Medicine Hat, Alta.

OFFICERS COMPLETING TOUR OF DUTY AT HALIFAX MANOEUVRES

Rank	Name	Address
Wing Com.	Leckie, Robert.	Laurentian Club, Ottawa, Ont.
Sqd. Ldr.	Shearer, Ambrose Bernice.	Morley, Alta.
Flt. Lt.	Fitzherbert, Henry Cecil.	Air Station, Halifax, N.S.
Flt. Lt.	White, Joseph Leonard Marie.	Cliffside Cottage, Sydney Mines, Cape Breton, N.S.
Flt. Lt.	Kane, Arthur Lester Allan.	71 Queen St., Halifax, N.S.
Flt. Lt.	Kenny, Walter Robert.	81 5th Ave., Ottawa, Ont.
F. O.	Stewart, Hugh Ronald.	Spring Park, Charlottetown, P.E.I.
F. O.	Owen, Edward Rosser.	380 Frank St., Ottawa, Ont.
F. O.	Roy, Leo Patrick Joseph.	St. Leonards, Madawaska Co., N.B.
F. O.	Moloney, Peter Joseph, M.C.	Ennismore, Ont.

DEVICE TO RELIEVE STRAIN ON FLYER

Georges Aveline, a French engineer, has invented a stabilizer for aeroplanes which, it is claimed, will make it possible for the pilot to leave his post while the machine continues flying automatically.

The appliances have been tested by the Messageries Aeriennes Company with success, it is said, in the Paris-Amsterdam line on a large passenger-carrying machine. The machine flew the whole route without the pilot, it is reported, once touching the levers.

Great importance is attached to the result by French aviation experts. It is declared that it will add enormously to commercial flying.

FIRST AIRSHIP

Mose:—"Dis yar flying business is ah mighty ol' venture."

Rastus:—"How you make that out, Mose?"

Mose:—"Because I heah that pastor say in church las' Sunday night dat Essau sold his heirship to Jacob."

WANTED, AND FOR SALE

Line advertisements under this heading 4 cents a word, minimum \$1.00.

Pilots and Wireless Operators seeking positions or companies wanting Pilots will hit the nail on the head by advertising in this column.

If you have anything to sell, advertise here.

Notices of meetings and propaganda work reaches the right people through this medium.

Through this column you are talking to your prospect direct.

Address Editor, Aviation and Wireless News, 60-62 Adelaide St. East, Toronto.

FREE Illustrated Literature. Outboards, New and Rebuilt Engines, Universal Joints, Pumps, Clutches, Gears, Aerial, Hyde, Gordon Reversible Propellers, etc. Canadian Boat & Engine Exchange, Toronto.

FOR IMMEDIATE SALE—One Curtiss Canuck in flying condition, Airworthy Certificate, with \$200 worth of spares. Make me an offer. F. W. McCrea, Sherbrooke, Que.

Sport Plane Builders Attention.—We can furnish for immediate deliveries the Lawrence L-A 3, 30/40 H.P. aviation motor; the latest 2-cylinder opposed type, air cooled; weighs only 128 pounds. Specially priced in original factory crate, \$200.00 complete.

Free advice and blueprint design of latest L-A 3 Sportplane. Bordelon, 108 Trolleyway, Venice, Cal.

We want you on our mailing list. Order from your news dealer or write us to-day. Please use the attached form.

AVIATION & WIRELESS NEWS,
60-62 Adelaide St. East, Toronto, Ont.

Please send to my address Aviation & Wireless News monthly for one year, starting at once, in payment for which enclosed find one dollar and fifty cents (\$1.50).

Name

Street and No. City or Town Province

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President
LT.-COL THOMAS GIBSON, C.M.G., D.S.O., Etc.
Vice-Presidents

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Honorary Treasurer
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1917-19—CAPT. JAMES P. BEATY
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1920—MAJOR B. S. WEMP, D.F.C., Etc.

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MR. W. F. SPARLING
LIEUT. H. S. CAMPBELL WILSON, R.N.V.R.
LIEUT. W. N. BICKLE

Club Headquarters: 34 Yonge Street, Toronto

OBJECTS OF THE AERO CLUB

1. TO PROMOTE AND MAINTAIN A SOCIAL ORGANIZATION OR CLUB FOR THE ADVANCEMENT AND ENCOURAGEMENT OF VARIOUS FORMS OF AVIATION.
2. TO ADVANCE THE DEVELOPMENT OF THE SCIENCE OF AERONAUTICS AND ITS PRACTICAL APPLICATION.
3. TO ENCOURAGE AND ASSIST THOSE DESIROUS OF TAKING UP AVIATION WITH A VIEW OF RENDERING SERVICE TO KING AND COUNTRY.

OBJECT NO. 1

Club quarters are being maintained, including lounge, billiards, cardroom and lunchroom.

- * Until further notice the Clubrooms are open daily from 9 A.M. to 10 P.M. except Sundays and public holidays
- * Meals are served daily to members and their guests.
- * THE DIRECTORS ARE NOW CONSIDERING PROPOSITIONS FOR MORE ADEQUATE QUARTERS IN WHICH IT IS HOPED TO PROVIDE BEDROOM ACCOMMODATION FOR VISITING MEMBERS.
- * As soon as deemed advisable and practicable, the Club will endeavour to maintain and operate an airharbor and suitable aircraft for the use of members, or to make suitable arrangements with an existing concern.
- * Out-of-town members are invited to write in to the club on any matters in which the Club can reasonably render personal service for members.

OBJECT NO. 2

Ways and means are being provided for making the Club a clearing house and information bureau on matters of aeronautical interest.

- * Members and others are invited to correspond with the Club — especially those who are engaged in commercial aviation, or are in a position to teach flying.
- * Owners of aircraft open for contract work are invited to register with the Club. Full information with regard to equipment and terms should be given.
- * It is desired to obtain costs of operation in order that reliable data may be compiled for the use of members and aviation interests.

OBJECT NO. 3

The Club is in favour of the Government maintaining an Air Force on adequate and economical lines consistent with the considered opinions, as to organization, of those competent to advise.

- * The Club will use its influence and organization in encouraging the youth of our country to engage in aeronautical work for the development of our commerce and natural resources, and for service to the Empire when necessary.

MEMBERSHIP

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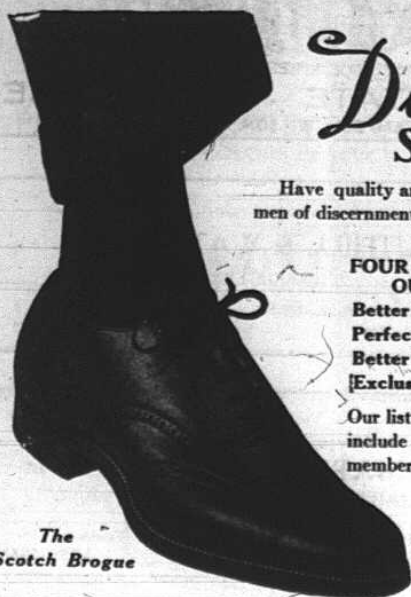
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